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WATSONIA

Journal of the Botanical Society
of the British Isles

VOL. I. 1949-50

EDITED BY
E. F. WARBURG
M.A., Ph.D.

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Corrections to Watsonia, Vol. 1.

p. 39. Under 65/1, for "Llandovey," read "Dovey."

p. 44. Under 239/1, for "Worthing," read "Worthy."

p. 50. Under 532/3×1, for "Llandoe," read "Llandre."

pp. 66 to 206. In page headings of all even numbered pages, for "1948" read "1949."

p. 105. Explanation of Fig. 2, read:—(a) flower, ×5; (b) column, ×10; (c) labellum, ×10; (d) seed, ×50; (e) branched rhizome, ×½.

p. 154. Under the title, add note:—Translated and adapted from Floderus, 1933, *Salicaceae Fennoscandicae*; the work of translation being due to Mrs Vivi Täckholm.—K.H.R.

p. 263. Under 876/5, for "Trebawn," read "Trabawn."

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E. F. WARBURG

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JANUARY 1949

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PUBLICATIONS

A list of the Society's publications available for sale will be found at the end of Watsonia Vol. I, Part I. They may be ordered from the Hon. General Secretary.

EDITORIAL

The change in title of our Society's principal publication marks a new development in its history. Hitherto the publications of the Society have consisted of the Report and the Distributors' Report, each published annually.

It is intended in future to substitute for the annual Report a Journal, of which this is the first number, to be published three or four times a year, and a Year-book to be published annually. The Year-book will contain those matters which are of interest to members of the Society only, such as Members' Lists, Reports of Officers and Excursions. The journal will contain the familiar features, Plant Records, Plant Notes and Nomenclature, and Abstracts from Literature, each of which will be published in a separate number. Each number will also contain papers and, at times, reviews and obituaries. The Distributor's Report will continue to appear separately.

There is at present no periodical devoted primarily to those aspects of British botany in which our Society is interested, notably the taxonomy and distribution of the higher plants, and we hope that *Watsonia* will supply this need. It is intended that the scope shall be wide. Papers will be published not only on systematic botany and distribution in the narrow sense, but also on any aspect of botany which adds to our knowledge of British plants considered as living organisms in the field (other than purely ecological papers, which are catered for elsewhere). The papers in this number have been chosen as far as possible to suggest the scope intended, though it is obvious that other types of paper are possible.

It is hoped to publish in each number something that will interest every member, whether a beginner or a more advanced student of the subject.

The title of the journal has been chosen with two points in mind, firstly to suggest its scope and secondly for ease in citation and the avoidance of confusion with other publications. An appreciation of the work of H. C. Watson, after whom the journal is named, appears in this number.

The basis of editorship of the journal has also been altered. The following members have kindly agreed to be responsible for the different regular features:—

Mr A. H. G. Alston—Abstracts.
Miss M. S. Campbell—Advertisements and Personalia.
Mr J. E. Lousley—Obituaries.
Mr W. R. Price—Index.
Mr E. C. Wallace—Plant Records and Revision of the *Comital Flora*.
Mr A. J. Wilmott—Plant Notes, Nomenclature and Revision of the *British Plant List*.

Material intended for any of the above regular features may be sent either to the Hon. Editor or to the members concerned, whichever is more convenient. The Hon. Editor will be responsible for original papers and reviews as well as for general supervision. Contributions from non-members as well as from members will be welcome.

It is hoped that members will appreciate the more frequent appearance of the Society's publications and that contributors will find that there is less delay in the publication of their papers than has been inevitable in the past.

H. C. WATSON

By R. D. Meikle.

"Watsonia," the title of our new journal, commemorates the name of Hewett Cottrell Watson, one of the most colourful figures in the annals of British botany, a staunch and active supporter of our society through many stages of its chequered history, and perhaps the greatest and most influential authority on the geographic distribution of British plants that this country has yet known.

Watson was born in 1804 at Firbeck, Yorks., received his scientific education at Edinburgh University, and died, unmarried, on 27th July 1881, at Thames Ditton, Surrey, where he had lived and worked for almost half-a-century.

If the bare record of Watson's life, as given above, be somewhat unexciting, the same adjective cannot with justification be attached to the man himself. He was a turbulent figure, a born controversialist, a pungent critic, and a most enthusiastic disturber of the peace—for indeed a profound and enervating peace had descended upon British botany in the 1830's, when Watson published his first works on British plant geography. The great days of discovery were over; Hudson, Withering, Curtis, Smith, and nearly all the eminent followers of the "Smithian-Linnean" tradition had passed away, and British botany stood in need of fresh blood and revitalization. True enough, there were still such able and active workers as Hooker, Graham, Lindley, and Robert Brown (and Watson had learned much from the first two), but they were busy men, too much occupied with academic matters or with exotic botany to have more than scanty leisure for research on the British flora. Babington had not yet published his *Manual*, and the first edition of Bentham's popular *Handbook* did not appear until 1858. British systematic botany was in danger of degenerating into a sort of outdoor (and indoor) game, with pretty pictures, simplified texts, ferns and portfolios, and melodious twitterings from the pens of Mr Edwin Lees and the gifted Miss Twamley—just the right kind of thing for the poetic young man or the refined young lady, with nothing technical or scientific to mar the pleasures of a gentle sport.

It was into the placid atmosphere of "greenery-yallery" refinement and pseudo-rusticity that Watson thrust his disturbing presence. In his earliest published work, *Outlines of the Geographical Distribution of British Plants* (1832), we hear the first mutterings of his discontent: "While the distribution of plants," he writes, "in most of the mountainous countries of Europe, has engaged the sedulous and successful attention of philosophic naturalists . . . . in our own country, this department of Botany has been almost utterly neglected; a few vaguely applied terms, as *alpine, hilly, mountainous* is all that botanists have yet attempted in the way of relative altitude, and the application of

these has often been calculated rather to mislead than to enlighten." This was but the beginning, for, in 1847, something far more weighty and disturbing appeared with the publication of *Cybele Britannica*, vol. I. Here was something novel indeed. Even the very title was considered uncouth and unpronouncable, and there were neither pictures nor poems, nor anything to please the languid botanical dabbler; nothing but cold hard facts, figures, statistics, numbers and names. Small wonder that the author "never recouped himself one penny of the cost of paper, print, and binding"! Yet this volume, and the three that followed during the succeeding twelve years, contributed more to British botany than all the outpourings of poetic-floristic flummery put together. *Cybele Britannica* stands as the first serious attempt to put British geographic and distributional botany on an exact scientific basis, to replace vague generalizations with concrete facts, and to analyse the character and content of the British flora. How far it succeeded can best be judged by comparing a pre-Watsonian local flora with a similar work of the present day; the former was, more often than not, a bare catalogue of plants and localities, with no effort made to discriminate between "natives" and "aliens," nor to determine the exact distribution, vertical or horizontal, of the plants enumerated. If any such information was included, it was all too often extracted word for word from Hooker's *British Flora* or some other popular work of the period. Of course, there were exceptions, but even the best of these would seem inadequate judged by modern standards, standards which were originally fixed in *Cybele Britannica*. Not that Watson's own work was faultless—the boundaries of his 112 vice-comital divisions were chosen somewhat arbitrarily, records were sometimes accepted from unreliable sources, and his views on the "species question" were dogmatic and occasionally unfair. But such blemishes were almost inevitable in view of the magnitude of the task, and the state of British botany at the time of its inception. The marvel is that the mistakes were not more numerous and more serious. Watson never claimed infallibility, and corrected many early errors in the *Compendium of the Cybele* and its supplements, and in *Topographical Botany*, his last large-scale work. *Cybele Britannica* was not an end in itself, but rather the starting point of investigations which continued long after Watson's death, carried on by our own society, and by innumerable field clubs and natural history organizations, many of them founded during the period of resurgence of field studies which followed the publication of his great work.

Watson had been an active field-botanist in his younger days, and throughout his life remained in close contact with botanists and botanical societies in all parts of the British Isles. Although geographical botany occupied the foremost place in his life, a glance through early numbers of the *Phytologist* and the *Journal of Botany* shows the wide range of his botanical interests. Not only botany, but psychology, politics, phrenology, and Darwinism were subjected to his cautious and searching scrutiny. As regards Darwinism, he anticipated several criti-

cisms subsequently put forward, and, in 1868, wrote: " the reaction against a first scepticism has been great and rapid in favour of the Darwinian doctrines. The danger now is that Mr Darwin will be supposed to have discovered and established much more than he truly has done "—a danger which has not abated with the passing of years.

Watson was, in some respects, a puzzling figure; ebulliently self-confident and dogmatic in his writings, he yet once admitted that " he never re-read in print aught written by himself without the decided conviction that it might have been much better done—better planned, and better worked out." Moreover, despite his outspoken criticism of " species-manufacturers," he could privately confess that the " splitters " understood British plants " far better than Hooker, Bentham and Arnott." His severest strictures were always addressed to those intellectually his equals—persons well able to defend themselves—and were always flavoured with a dash of impish humour, so that, at their worst, they were never wholly unpleasant, and, at best, choice feasts of wit and logic. Nothing short of a full-scale biography can hope to do justice to such a rare personality, but readers who wish to taste some of his humour and learning should consult the prefaces and appendices to *Cybele*, its *Compendium* and supplements—where Babington, Baker and Backhouse are irreverently described as the three " Industrious *Bees* " of Botany, and poor Baker is dismissed with his fellow rhodologists as a mere " Dog-rose fancier "! But these are asides; Watson will be remembered for his serious contributions to botanical science long after the quips and quarrels are forgotten, and this society sets itself a high standard in adopting the name of one whose creed it was that " intellectual truth should be held paramount over all other considerations."

[A detailed account of Watson's life and works, by J. G. Baker, appears in the *Journal of Botany*, *19* (1881). Additional information will be found in the introduction to Druce's *Comital Flora*, pp. xii-xviii, and a list of his published works in *Bot. Centralbl.*, *7*, 254 (1881)].

ALCHEMILLA VULGARIS L. agg. IN BRITAIN

By S. M. Walters,
Botany School, Cambridge

The " micro-species " distinguishable within the aggregate species *Alchemilla vulgaris* L. have been the object of study of a number of taxonomists in Britain, particularly since the accurate work of Buser in the Alps focussed attention on the group at the end of the last century. Records of a number of these species are scattered through the pages of the *Journal of Botany* and of the *B.E.C. Report*, especially in the period 1920-32, when Salmon, Druce and Wilmott collected and studied them; and in the recent *Check List of British Vascular Plants* (Clapham; 1946) no fewer than eighteen are listed. A close inspection of the literature reveals that the majority of these species, which were originally described by Buser on the Continent, owe their presence in a British species list to identifications of British material submitted to Buser's pupil, Jaquet, principally by Salmon; further, that Jaquet's identifications had sometimes been questioned, indeed rejected, by other authorities to whom the specimens had been submitted. Thus Lindberg considered material identified by Jaquet as *A. tenuis* Buser (now in Herb. Mus. Brit.) to be referable to *A. filicaulis* Buser; and Wilmott rejected Jaquet's determination of a specimen (in Herb. W. A. Sledge) as *A. firma* Buser, naming it *A. acutidens* Buser. Further study of the records of several of these species in Britain, combined with a perusal of recent continental literature, soon confirms one's suspicion that Jaquet's determinations are unfortunately most unreliable, and that a complete revision of the group in Britain is badly overdue. This paper does not pretend to do much more than to clear the ground for a fuller understanding of the group's British representatives; but it will have served its purpose if this very necessary clearance is accomplished.

In the Norwegian floras of Nordhagen (1940) and Lid (1944) good descriptions and a key are given for most of the Scandinavian *Alchemilla* species, based chiefly on the work of Lindberg (1909) and Samuelsson (1940, 1943 A, B). Changes of nomenclature have been incorporated following the work of Rothmaler, who published a series of papers between 1934 and 1944 on the systematics and nomenclature of the genus. In these papers a great deal of useful information is collected and to this further reference will be made. The work of Juzepczuk, who is responsible for the detailed treatment of the genus in the *Flora SSSR* (1941) should also be mentioned; both Rothmaler and Samuelsson availed themselves of this work. In 1943 Samuelsson published a detailed monograph on the distribution of " *vulgaris* " species in N.

Europe; in this paper, distribution maps are given for some twenty Scandinavian species, and their total range (i.e. Euro-Asiatic) indicated where known. Much of the following paragraph is based on this work.

The striking fact which emerges from the recent continental work is that not a single " *vulgaris* " species is known to be endemic to any part of Scandinavia. Correlated with this fact is a marked differentiation between species in geographical range. Thus Samuelsson distinguishes three main types of distribution in the Scandinavian species, each of which is represented by one or more British species: the Atlantic (e.g. *A. xanthochlora* Rothmaler = *A. pratensis* auct. non Schmidt); the continental (e.g. *A. monticola* Opiz = *A. pastoralis* Buser); and the Arctic-Alpine (e.g. *A. glomerulans* Buser). This state of affairs is in marked contrast to the situation in e.g. *Hieracium* in N. Europe, which contains a considerable number of local endemics. Samuelsson makes the suggestion that this difference is to be correlated with the purely vegetative apomixis of *Alchemilla*, allowing no meiosis and recombination, as contrasted with the possibility of genic recombination in embryoformation in *Hieracium*. For a further discussion of the status and possible age and origin of the apomicts, his monograph should be consulted.

On the basis of Rothmaler's work, the British *Alchemilla* species may be grouped as follows:—

Sub-genus *Aphanes* (L.) Rothm.

Annuals. Single stamen opposite a sepal, inserted on the inner margin of the disk, anthers extrorse. Cosmopolitan.
A. arvensis L.

Sub-genus *Lachemilla* (Focke) Lagerheim.

Perennials. Stamens 2 (rarely 1, 3 or 4) opposite the sepals, inserted on the inner margin of the disk, anthers extrorse. Central and South America.

Sub-genus *Eu-Alchemilla* (Focke) Buser.

Perennials. Stamens 4, alternating with the sepals, inserted on the outer margin of the disk, anthers introrse. [Several sections of this sub-genus are confined to African mountains; and the section *Pentaphylleae*, containing the single species *A. pentaphyllea* L., is strictly Alpine.] Only the following has British representatives.

Section *Brevicaulon* Rothm.

Herbaceous. Stems (perennial) largely underground, apices only above ground, with very short internodes, bearing a rosette of leaves, and annual flowering stems. Style 1. N. Hemisphere (?Tropical African mountains, and Australia).

[Sub-section *Calycanthum* Rothm. (incl. *Calycinae* Buser). Sepals longer than the urceoles, which are mostly turbinate, rarely sub-globose. Epicalyx segments longer or scarcely shorter than the sepals. Mature achene protruding from urceole, clearly exceeding the disk. Europe: Alps to Caucasus.]

Sub-section *Chirophyllum* Rothm. (=*Alpinae* Buser pro parte). Sepals more or less equalling the sub-globose urceoles. Epicalyx segments minute, linear-lanceolate, scarcely half the length of the sepals. Mature achene enclosed in urceole, not exceeding disk.

A. alpina L., *A. conjuncta* Bab.

Sub-section *Heliodrosium* Rothm. (=*Vulgares* Buser pro parte). Sepals shorter than the sub-globose or ovoid urceoles. Epicalyx segments ¾ length of sepals Mature achene enclosed in urceole, not exceeding disk.

[1. *Splendentes* Buser.

Leaves 9 to 11-lobed; lobes deep, more or less entire laterally; teeth small, acute. Silkily-hairy on stems and lower surfaces of leaves.

A. splendens Christ, Alps, *A. faeroënsis* (Lge.) Buser. Faeroes, Iceland.]

2. *Pubescentes* Buser.

Plants usually dwarf, densely silkily-hairy, with pubescence extending to pedicels and urceoles. Inflorescence characteristically with flowers in dense clusters. Teeth of leaf-lobes (4) 5 (6), broad, rather obtuse.

(1) *A. minor* Huds.

3. *Eu-vulgares* E.-G. Camus.

Pubescence variable, but usually pedicels at least glabrous. Teeth of leaf-lobes (5) 6-9 (10), usually narrow and rather acute.

A large and heterogeneous group, subdivided artificially:—

(a) *Hirsutae* Lindb. fil.

Stems and petioles more or less densely clothed with spreading hairs.

(2) *A. acutiloba* Opiz.
(3) *A. filicaulis* Bus.
(4) *A. minima* Walters sp. nov.
(5) *A. monticola* Opiz.
(6) *A. vestita* (Bus.) Raunk.
(7) *A. xanthochlora* Rothm.

[(b) *Heteropodae* Bus.

Petioles of spring leaves glabrous; otherwise as (a). Alps.]

(c) *Sub-glabrae* Lindb. fil.

Stems and petioles clothed with adpressed hairs to a variable extent (may be almost glabrous).

(8) *A. glabra* Neyg.
(9) *A. glomerulans* Bus.
(10) *A. obtusa* Bus.
(11) *A. Wichurae* (Bus.) Stéf.

[(d) *Glabrae* Rothm.

Stems and petioles quite glabrous. Alps. e.g. *A. coriacea* Bus.]

Groups in brackets have no British representatives.

The eleven species listed in the sub-section *Heliodrosium* are the only "*vulgaris*" species which can for the present be said with certainty to be British. All the other recorded species are either false determinations or highly questionable ones. Most of these species are already adequately described in the literature (see Wilmott 1922 B); descriptions are only given to *A. acutiloba* and *A. obtusa*, not previously recorded in Britain, and to *A. minima* sp. nov. in the account which follows, and a key is appended.

(1) *A. minor* Huds. (=*A. hybrida* L. em. Mill. = *A. pubescens* Lam. =*A. glaucescens* Wallroth 1840: Erster Beitrag zur Flora hercynica; *Linnaea*, *14*, 134).

The name *A. minor* is being used for this plant, although there is no agreement between the various authors on this point of nomenclature. Juzepczuk (1941) considers Hudson's name valid; Samuelsson, however, uses *A. glaucescens* and Rothmaler *A. hybrida*. (See Wilmott 1939, and Rothmaler 1941 and 1944).

For the distribution of *A. minor* Huds. in Britain, see Wilmott (1939). The status of the plant in v.-c. 83 seems doubtful; an escape from cultivation is probable. This is certainly the case with the v.-c. 17 (Surrey) record (see Salmon, *Flora of Surrey*, 287). Authentic records, however, exist for v.-c. 105 (W. Ross) (Wilmott, spec. in Herb. Mus. Brit.), and Ireland. The main area of the plant in Britain is undoubtedly the N. English limestone; thus, on the limestone pavement of the slopes of Ingleborough (v.-c. 64), it is locally abundant. The species exhibits a "continental" type of distribution, widespread in Central Europe and ranging from the W. Alps to W. Siberia. It is locally common in Denmark and S. Scandinavia, particularly on calcareous rock.

(2) *A. acutiloba* Opiz (=*A. acutangula* Bus.).

This species was first noted as British by Wilmott, who in 1946 found a sheet in Herb. Mus. Brit. collected in Teesdale in 1933 by J. F. G. Chapple and previously labelled *A. pastoralis* Bus. A visit to Upper Teesdale in July 1947 has revealed that the plant is occasional on roadsides and in hay meadows, growing with *A. monticola* and the other common species over several miles of the valley, and in at least one locality is very luxuriant and locally dominant. All the localities so far seen are in v.-c. 66.

As no account of the species is available in English, the following outline description is given; for a full description of the species, see Lindberg's monograph (1909).

(1) Plant robust, tall-growing, with rather long narrow inflorescence; lowest cauline leaf long-petioled.

(2) Summer leaves with characteristic triangular, pointed lobes.

(3) Thick spreading hair on petioles and on lower part of stem; inflorescence-branches and floral region glabrous. Summer leaves very variably hairy above; some uniformly covered, others with hair only on folds, others practically glabrous.

The plant has a " continental " distribution in Europe, very closely resembling that of *A. monticola* (q.v.), which it frequently accompanies in sub-alpine meadows and on roadsides. The similar association of the two species in Teesdale is yet another indication of the floristic uniqueness of this region.

(A third species, *A. gracilis* Opiz (*A. micans* Bus.) has a similar European distribution; it should be looked for in Teesdale, particularly in view of the fact that there is a single inadequate Teesdale specimen (Druce, in Herb. Mus. Brit.) which is doubtfully referable to this species. The plant resembles *A. monticola* closely in hairiness, except for the possession of glabrous urceoles; the inflorescence is very narrow, and the leaves are reniform in outline with rather acute teeth. It is included in the key to the species.)

(3) *A. filicaulis* Bus.

This plant is not uncommon above 1500′ on Scottish mountains; it occurs also in N. England (*A. Salmoniana* Jaq. on Helvellyn, v.-c. 69, also Mickle Fell, v.-c. 65: Walters, July 1947), and at low levels in the extreme North (e.g. Orkneys). In many herbaria, typical *A. vestita* (q.v.) has been labelled *A. filicaulis*, following a paper by Linton (1895), and some confusion arises because of this. The extra-British distribution of this species is discussed with that of *A. vestita* later.

(4) **A. minima** sp. nov.

Planta minima, rhizomate satis longo, tenue; foliis parvis 1.5 ad 3 cm. latis, 1.2 ad 2.5 cm. longis, reniformibus, sinu basale lato, in vivo, supra caesiis, subtus griseo-viridibus 5 aut (praesertim foliis aestivalibus) imperfecte 7 lobis; lobis, praesertim foliorum praecocium, ab

incisuris profundis edentulis separatis; dentibus (7) 9 aut 11 in margine distale loborum, satis angustis, acutis, conniventibus; foliis cum pilis patulis longis varie vestitis, pilis, saepe, nisi in venulis subtus plicisque supra sparsis; petiolis praecocibus saepe fere glabris, serotinis cum pilis patulis; stipulis laete brunneis; caulibus 3 ad 8 cm., arcuato-ascendentibus, tenuibus, fere filiformibus, cum pilis patulis vestitis; inflorescentia parva, pauciflora, floribus (3 mm.) in glomerulis densis parvis; urceolis in vivo 1.5 ad 2 mm. longis, anguste piriformibus, cum pilis patulis; pedicellis quoque cum pilis patulis.

Very dwarf plant, with rather long slender rhizome. Leaves small, 1.5 to 3 cm. wide, 1.2 to 2.5 cm. long, reniform, with wide basal sinus, blue-green above and greyish-green below in fresh state, 5-lobed or (particularly on summer leaves) incompletely 7-lobed. Lobes, especially on early leaves, deeply separated ($\frac{1}{3}$ to $\frac{1}{2}$ of lamina) by toothless incisions; teeth (7) 9 or 11 on distal margin of lobes, rather narrow, acute and connivent. Leaves variably clothed with long spreading hairs, often poorly-developed except on veins below and folds above. Early petioles often almost glabrous, later ones with spreading hairs. Stipules light brown. Stems 3 to 8 cm., arcuate-ascending, slender, almost filiform, with long spreading hairs. Inflorescence poor, few-flowered; flowers (3 mm.) in small condensed glomerules. Urceoles 1.5 to 2 mm. long in fresh state, rather narrowly pyriform, with spreading hairs, which are present also on pedicels.

Simon Fell, Ingleborough, M.W. Yorks. (v.-c. 64), S. M. Walters, 29-7-47; type in Herb. Univ. Cantab.

A. minima is quite easily separable in the field from small *A. vestita* (which is the only plant with which it might be confused) by its deeply-5-lobed blue-green leaves and its very dwarf habit of growth. Plants cultivated since June 1946 are still (September 1947) perfectly dwarf, rising less than 3 cm. above soil-level. Although it possesses many of the characters of Buser's " subnival " dwarf species of the Alps (Buser, 1894) it is clearly not identical with any which he described. It seems to resemble most closely *A. exigua* Bus. (*A. pusilla* Bus., 1893, *Bull. Herb. Boiss.*, *1*, *App. 2*, 23, non Pomel) but differs in both hair distribution and leaf-shape sufficiently to make a distinction necessary. In view of this, it has been thought desirable to describe the plant as a new species, although further study may reveal that it is identical with an already described continental species. It is very remarkable that no such dwarf species are known in Scandinavia, where very extensive study has been given to the *Alchemilla* segregates.

The plant is as yet only known in Britain from the slopes of Ingleborough (v.-c. 64), where it grows in at least three quite separate areas on damp grazed limestone pasture between 1000′ and 2000′, associated with one or more of the three common species, *A. glabra*, *A. vestita* and *A. xanthochlora*, all dwarfed by grazing. In habitat requirements *A. minima* is quite distinct from *A. minor*, which grows in the vicinity, but only on the drier, barer limestone. It is likely that a care-

ful search of herbarium material from the northern limestone will show that the plant occurs elsewhere. Buser in his paper on the subnival species (1894) makes the interesting comment that the relative scarcity of such plants in herbaria is probably due to their being overlooked by collectors as environmentally-dwarfed specimens of the species of normal stature. It seems clear that in the Alps, as on Ingleborough, genetic dwarf species and phenotypically dwarf plants of the taller species grow mixed together. Their separation in the field is, according to Buser, always possible; but it is naturally difficult where the number of species involved is greater than two or three. So far, however, the problem appears to be relatively simple in Britain, although the assumption that the vast majority of our upland *Alchemilla* populations of dwarf stature are made up simply of phenotypically dwarf specimens referable to the widely-distributed " normal " species is one which should be tested by extensive cultivation experiments. It is hoped to publish the results of some such experiments at a future date.

(5) *A. monticola* Opiz (=*A. pastoralis* Bus.).

For a discussion of the validity of this and other Opiz names, see Rothmaler (1941).

This plant was first detected in Britain by Wilmott in Teesdale material (Wilmott 1922). It has since been recorded for v.-c.'s 17, 37, 64 and 96; of these records the last two are false identifications, that for 37 has not been traced, and only 17 (Surrey) is known to be correct. A sheet of the Surrey plant (near Woking, 1906 and 1908, M. Saunders) is in Herb. Mus. Brit.; and the plant occurred much more recently in Surrey, for it was collected near Box Hill in 1932 by J. E. Lousley. Unfortunately, it may have gone from the latter locality, and has not been confirmed in the earlier one.

In Teesdale (July 1947) *A. monticola* is frequent or even abundant on the roadsides and in hay meadows, extending for at least 10 miles along the valley, and occurring in at least one smaller valley to the south. It is, therefore, in both v.-c.'s 65 and 66. Whatever doubt may reasonably attach to the status of the plant in Surrey, its native status in Upper Teesdale can hardly be questioned. The parallel between the disjunct distribution shown by this species and by *A. acutiloba*, and that shown by other " continental " Teesdale rarities (e.g. *Viola rupestris*) is very striking.

(6) *A. vestita* (Bus.) Raunk. (Raunkiaer, 1906, *Dansk Ekskursionsflora*, p. 145) (*A. minor* auct. non Huds., *A. anglica* Rothm., *A. pseudominor* Wilmott.

This name has been adopted by the Scandinavians for the wide-ranging species which Buser originally described as a variety of *A. filicaulis*. It is the most widely-distributed *Alchemilla* in Britain, and practically all the records for *A. vulgaris* L. agg. in the south of England refer to this plant.

Although the morphological difference between *A. vestita* and *A. filicaulis* is very slight—the only " good " character appears to be the hairiness of the inflorescence—nevertheless, the two can with rare exceptions be satisfactorily separated in the field, and exhibit somewhat different geographical ranges. Both have an " amphi-atlantic " distribution, occurring in Iceland, Greenland and N. America as well as N. and W. Europe, but *A. filicaulis* is constantly more northern or Alpine, and in Britain largely restricted to mountain habitats.

(7) *A. xanthochlora* Rothm. (Rothm. 1937, *Rep. Spec. Nov. Reg. Veg.*, *42*, p. 167) (*A. pratensis* auct. non Schmidt).

This species, one of the common British *Alchemillas*, shows a rather clearly oceanic distribution in Europe—Samuelsson likens it to the *Ilex*-element of the European flora. In S.W. Scandinavia, it is restricted to one or two areas where it may possibly be introduced, and is absent from the Faroes and Iceland.

(8) *A. glabra* Neygenfind, 1821, *Enchirid. Bot. Siles.*, 67.; cf. Rothmaler, 1937, *loc. cit.*, 168 (*A. alpestris* auct. vix Schmidt).

This species is common in Northern England and Scotland; it is somewhat oceanic in general distribution in Europe, though by no means in so restricted a sense as *A. xanthochlora*, and is quite widespread in Central and South Scandinavia.

(9) *A. glomerulans* Bus.

This plant is markedly arctic-alpine in distribution. In Britain it occurs at altitudes above 2000′ on Scottish mountains (rarely lower where washed down streams), and also in Teesdale, v.-c. 66 (Walters, July 1947). Its discovery in Teesdale, at altitudes from 1000′ to 1500′, is a striking addition to the arctic-alpine flora of this valley. Outside Britain it occurs in the Alps (whence Buser first described it), and is widespread in Iceland, Greenland and Scandinavia, particularly in the mountains of Norway and Sweden.

(10) *A. obtusa* Buser.

A plant collected by Mr A. H. G. Alston at Balgavies Loch in Angus (v.-c. 90) on 31-8-47 is referable to this species. For a complete description, see Buser (1895) and also Lindberg's monograph (1909). Typically, the plant differs from *A. glabra*, which it rather closely resembles, in the following points:—

(1) Leaf-lobes wide, shallow, very obtuse.
(2) Teeth on lobes large, wide, sub-equal.
(3) Cauline leaves well-developed; inflorescence narrow and poorly-developed.
(4) More obvious pubescence, not closely appressed; stem hairy up to first inflorescence-branch, and all except the earliest petioles hairy.

Although a well-grown plant of *A. obtusa* is easily recognisable on these points, it seems likely that separation of less well-developed plants from *A. glabra* will present some difficulty, as the characteristic hairiness in particular may not appear on small specimens. As in other species, a knowledge of the phenotypic range must be gained by cultivation.

The Euro-Asiatic distribution of *A. obtusa* is remarkably wide and scattered, and is exceptional in covering almost the whole area of the aggregate (cf. Samuelsson's monograph, 1943 B, 21).

(11) *A. Wichurae* (Bus.) Stéf. (Stéfansson 1901, *Flora Islands*, 135).

In his monograph (1909) Lindberg confessed that he was unable to separate the several species described by Buser as *A. acutidens*, *A. connivens*, its variety *Wichurae*, etc., and, therefore, included all such forms under *A. acutidens* Bus. ampl. Lindb. fil. The recent Scandinavian authors, however, appear to have distinguished to their satisfaction at least three species of "*acutidens*" type, viz., *A. Wichurae* (Bus.) Stéf., *A. Murbeckiana* Bus. and *A. oxyodonta* (Bus.) C. G. West. Of these, much of the British material is referable to *A. Wichurae*, with which Salmon's var. *alpestriformis* of *A. acutidens* seems to be identical (Salmon, 1914). There are, however, British plants not satisfactorily referable to this species, on which further study is necessary.

The distribution of *A. Wichurae* in Britain is very incompletely known, but it appears to be restricted to calcareous rock and soil in mountainous regions of N. England and Scotland. On Ben Lawers and the adjoining mountains it is frequent on wet rock in the corries and on streamsides. In N. England plants collected by me on Ingleborough, v.-c. 64 (June 1946), and in Teesdale, v.-c. 65, 69 (July 1947), are typical.

Its complete distribution is, like that of *A. glomerulans*, arctic-alpine; it is recorded from Greenland, Iceland, Scandinavia and the Alps.

Some attempt must now be made to assign the various species described by Jaquet as occurring in Britain to their correct place. Rothmaler (1941), 245, has made such an attempt, which, particularly in view of the sparse nature of his British material, was a very creditable one. It is perhaps of interest to quote him *in extenso*:—

> "Concerning the occurrence of *Alchemilla* species in Britain the most remarkable ideas have been circulated through Jaquet's work "—(here follows a passage on the unreliability of Jaquet's determinations)—" *A. subcrenata* Bus., a Euro-Siberian species, was described (i.e. by Jaquet) from England as varying with hairy urceoles; *A. coriacea* Buser is mentioned with a *hairy* stem, and a new species of the *Splendentes* with *patent* hairs on the stem. Particularly absurd are the references to the S.W. European *A. coriacea*, the high alpine *A. tenuis*, *A. heteropoda*, *A.*

colorata and *A. curtiloba*. Because of shortage of British material I have not yet been able to clear up all these points; but according to Buser and Lindberg, who saw many British specimens, the following species occur commonly in the British Isles: *A. glabra* Neyg., *A. minor* Huds., *A. xanthochlora* Rothm., and *A. filicaulis* Buser. Ostenfeld later discovered *A. Wichurae* (as ' *A. acutidens* ') on the East side of Scotland. Later, *A. hybrida* and *A. glomerulans* were found, but only as rare occurrences. All further records are quite unbelievable: *A. coriacea* Jaq. = *A. glabra* Neyg.; *A. Salmoniana* Jaq. and *A. tenuis* Jaq. = *A. filicaulis* Buser; *A. subcrenata* Jaq. = *A. minor*; while *A. curtiloba* Jaq. might be based on autumn specimens of *A. xanthochlora*. *A. acutidens, acuminatidens, reniformis, connivens* and *firma* belong partly to *A. Wichurae*, partly to *A. glabra*!"

An inspection of herbarium material determined by Jaquet quickly shows that Rothmaler's remarks are fully justified. Adopting the approximate order of the species in Clapham (1946), the following would appear to be the correct assignations of the Jaquet determinations:—

" *A. curtiloba* " = *A. xanthochlora*.
" *A. subcrenata* " = *A. vestita*.
" *A. heteropoda* "; " *A. tenuis* "; *A. Salmoniana* Jaq. = *A. filicaulis*.
" *A. reniformis* " = *A. glomerulans*.
" *A. connivens* "; " *A. firma* " = *A. Wichurae*.
" *A. coriacea* " = *A. glabra*.
" *A. crinita* " = *A. monticola*.
" *A. colorata* " = *A. vestita*.
" *A. acuminatidens* "; " *A. controversa* " = *A. glabra*.

It should be emphasised that the ten Buser species thus excluded from the British list are perfectly distinct in the Alps, whence Buser described them.

With the exception of *A. minima*, the truly British species dealt with in this paper are all widespread in Europe, occurring both in the Alps and in Scandinavia; and, while careful study of British *Alchemillas* may reveal the presence of some other species, such facts concerning distribution and lack of local Northern endemics as have been outlined suggest that these will be few in number.

The appended Key to the British species is based partly on the keys of Samuelsson (1940), 449, and in Lid's *Norsk Flora* (1944).

A fuller account of the British *Alchemillas* is in preparation for the Biological Flora of the British Isles, and any information relevant to the distribution and ecological differentiation of the species would be gratefully received. I should also be very pleased to see any material which is not readily identifiable.

I wish to acknowledge with gratitude the receipt of a grant from the Department of Scientific and Industrial Research, during the tenure of which much of the final preparation of this paper has been undertaken. I am also indebted to Mr A. J. Wilmott and to Dr E. F. Warburg for help with information and criticism.

KEY TO THE BRITISH SPECIES UNDER *ALCHEMILLA VULGARIS* L. agg.

1a. Stem (at least the lower part) and petioles with spreading hairs.

2a. Whole plant, including pedicels and urceoles, hairy.

3a. Leaves more or less circular in outline, with 7 or 9 broad, obtuse lobes, and with basal sinus closed by the often overlapping basal lobes. Teeth of lobes 9 or 11, rather straight and obtuse. Stipules brownish. Plant rather dwarf, strongly silkily hairy all over. Upland limestone in N. England; also in Scotland and Ireland ..... *A. minor* Huds.

3b. Leaves reniform in outline, with open basal sinus.

4a. Plant very dwarf, with rather long slender rhizomes, and weak, decumbent-ascending few-flowered stems, 3-8 cm. long. Leaves 5- or incompletely 7-lobed; lobes, especially on spring leaves, separated by deep, toothless incisions ⅓ to ½ width of lamina. Teeth (7)9 or 11, rather acute and connivent, on distal margin of lobe. Leaf-lamina 1.5 to 3 cm. wide, 1.2 to 2.5 cm. long, rather strikingly blue-green in fresh state. Stipules light brownish. Whole plant covered with rather scattered spreading hairs, often very sparse on early petioles and restricted to folds on upper leaf-surface and veins below. Ingleborough, Yorks. ? elsewhere ..... *A. minima* Walters.

4b. Plant typically larger than the two preceding species. Leaf usually 7-lobed, lobes semicircular to semi-elliptical ¼ to ⅓ width of lamina, with (9)11 or 13 rather curved, acute teeth all round lobe margin. Stipules more or less wine-red. Hairiness rather variable in density, typically greater than in *A. minima*, less than in *A. minor*. Widely distributed, extending into S. and E. England ..... *A. vestita* (Bus.) Raunk.

2b. Pedicels, at least, glabrous.

5a. Upper leaf-surface hairy, at least on the folds.

6a. Leaves more or less circular in outline, 9- to 11-lobed, with closed basal sinus, strongly hairy on both surfaces. Inflorescence-branches and urceoles usually quite hairy. Teesdale (and Surrey) ..... *A. monticola* Opiz.

6b. Leaves more or less reniform in outline, 7- to 9-lobed, with open basal sinus.

7a. Leaf-lobes markedly triangular, pointed, with (13)15-19(21) narrow pointed teeth, of which the middle ones on the lobe margin are the largest. Urceoles glabrous. Plant robust. Teesdale ..... *A. acutiloba* Opiz.

7b. Leaf-lobes rounded.

8a. Teeth on lobes (9)11 or 13(15). Urceoles often sparsely hairy. Plant usually small, with slender stems. Scotland and N. English mountains ..... *A. filicaulis* Bus.

[8b. Teeth on lobes (13)15 or 17. Urceoles glabrous. Leaves and petioles more strongly hairy than in *filicaulis*. Plant medium in stature, inflorescence typically long and narrow ..... *A. gracilis* Opiz.]

5b. Upper leaf-surface glabrous.
9a. Leaf-lobes rounded, teeth sub-equal. Common in Scotland and N. England ..... *A. xanthochlora* Rothm.
9b. Leaf-lobes triangular, pointed; teeth largest in middle of margin. Teesdale ..... *A. acutiloba* Opiz.

1b. Stem and petioles with adpressed hairs (may be ± absent).
10a. Petioles and stem (except usually the inflorescence-branches) quite densely clothed with silky adpressed hairs. Upper leaf-surface usually distinctly hairy. Leaf-lobes very characteristically wavy in fresh state (in pressed leaves this is revealed as folded, overlapping lobes). Inflorescence very compact. Plant robust. Scottish mountains and Teesdale ..... *A. glomerulans* Bus.
10b. Stem glabrous above second internode; upper leaf-surface glabrous.
11a. Leaf-outline more or less circular, with closed basal sinus, and wide, obtuse lobes. Leaf-lobes separated by a distinct toothless V-shaped groove. Teeth on lobes narrow, curved, acute, sub-equal, terminal tooth usually as wide as laterals and little if any shorter than them. Mountains, Scotland and N. England ..... *A. Wichurae* (Bus.) Stef.
11b. Leaf-outline more or less reniform with open basal sinus. No distinct toothless V-shaped groove between lobes. Teeth on lobes broad, obtuse or obtusish, terminal tooth markedly narrower than its neighbours and usually much shorter.
12a. Leaf-lobes triangular to ½-ovate, ¼ to ⅓ of "radius" of leaf; teeth rather unequal, with largest teeth midway between tip and base of lobe. Stem almost completely glabrous, or with adpressed hairs on lowest (short) and next lowest (long) internode. Common in Scotland and N. England ... *A. glabra* Neyg.
12b. Leaf-lobes arcuate, very obtuse, not more than ¼ of "radius" of leaf; teeth large, sub-equal. Stem typically with sub-adpressed hair up to first inflorescence-branch (i.e. 3 internodes usually). Angus ..... *A. obtusa* Buser.

The following points should be observed: —

1. *Leaf-characters*, unless otherwise stated, refer to mature summer rosette leaves; the early spring leaves, and the cauline leaves, often differ considerably in shape, toothing and hairiness.

2. Although *hair-distribution* is a valuable character, and much less variable than one might expect, nevertheless there *is* variation, particularly in *A. acutiloba*, *A. filicaulis*, *A. glomerulans*, *A. Wichurae*, *A. obtusa* and *A. glabra*, and a key dependent on hairiness only would occasionally fail to distinguish accurately between the last three in particular.

3. The distinction between "spreading" and "adpressed" hairs may seem trivial, yet in practice it is found to work remarkably well. Hairs are "spreading" when most of them make an angle greater than 45° with the stem or petiole; in forms with "adpressed" hairs these are closely applied to stem or petiole and adpressed hairiness may be rather difficult to distinguish without a lens.

4. *Habit of plant*, although affording useful points of distinction, is difficult to employ in a key owing to the impossibility of separating phenotypic from genotypic effects without cultivation. Thus *A. glabra* will on cultivation (and often does in the wild state) make a medium-

sized or even large plant, standing 1′ or more in height, whereas *A. Wichurae* remains much more dwarf in cultivation; yet where the two are growing together, both may be quite dwarf, and the character useless.

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LINES OF EVOLUTION AND GEOGRAPHICAL DISTRIBUTION IN RUMEX SUBGEN. LAPATHUM†

By K. H. Rechinger.

The docks, having no showy flowers, do not awake aesthetic feelings as do, for instance, brightly-coloured flowering plants or plants distinguished by a peculiar habit. The more intimate beauty which lies in the various graduated shades of red, brown and yellow of the ripe fruiting panicles, contrasting with the dull green willows accompanying the river banks, is not so obvious. Nevertheless, it belongs undoubtedly to the general impression of a landscape in autumn. On the other hand, when looked at with a certain attention the amazing variability in size and shape of the inner perianth segments at the fruiting period offer a great deal of pleasure.

The fact that they are weeds becomes clear when it is known that some of them are spread over the whole world, e.g. *R. crispus* and *R. conglomeratus*, and that it is hard to distinguish between the original and secondary part of their areas. On the contrary, there are among the docks many which have very limited areas and very pronounced ecological demands, and which show no tendency to secondary distribution. Some of them inhabit swamps, others are confined to the banks of certain big rivers and their tributaries, so that the Nile, the Volga and some of the large Asiatic rivers have docks of their own. Other species are confined to certain mountainous regions or islands of the tropics.

Collectors and plant-amateurs have not been alone in their apparent distaste for the genus. Scientific botanists, too, have obviously neglected it. It has been monographed only twice as a whole—by Campdera in 1819 and by Meisner in DC. *Prodromus* 1856. When glancing through Meisner's work one has the impression that it was not induced by a special interest but rather accomplished to fill a gap in De Candolle's encyclopaedic work. More modern papers on *Rumex*, such as those by Murbeck, Danser and Trelease, deal with species of limited regions and are not concerned with the natural arrangement of the whole genus.

The main groups of the genus—*Acetosella, Acetosa* and *Lapathum*—have nevertheless been distinguished since the earliest authors as well as by the public—the first two under the name of sorrels, the last as docks. I am dealing here only with the docks, the *Lapatha*, which include several hundred species and comprise the larger part of the genus.

I have already mentioned the amazing variability of the fruiting inner perianth segments, which have been termed valves. Being small and uniform in the flowering state, they increase and change their shapes

†A lecture given to the British Association in Dundee, 1947.

in different manners indicating different and very distinct lines of evolution. Moreover, these transformations are combined with certain characters of the vegetative system, in this way furnishing the basis for a more natural arrangement of the species. The many transformations of the valves during the ripening process are easily reduced to three main types:—1. The valves increase, they become membranaceous and a network of nerves develops; 2. The midrib of one or of all three valves thickens more or less and is transformed into a callosity; 3. The margin of the valve grows out into teeth of various size and form. These types may occur separately or variously combined. In some cases one special type corresponds with a single species or group of species, in other cases all possibilities of combinations occur within a single very polymorphic species, thus causing many cases of parallelism and convergence. These phenomena, till now not clearly recognized, together with the frequent hybridization, give rise to the main difficulties of classification within the subgenus. No serious attempt has been made till now to establish a natural arrangement. Meisner's division of his section *Lapathum* into two groups—with entire and with dentate valves—is a mere artificial one. It separates species nearly related to each other and brings close together species showing superficial resemblance only. In contrast to this artificial arrangement I have tried to find out lines of development leading from more primitive forms to more differentiated ones. I think that a species may be regarded as more primitive the less the inner perianth segments are transformed during the ripening process.

Thus the first of the main types mentioned above represents the most primitive, the second—sometimes but not always combined with the first—is more advanced and the third—often combined with the second, sometimes more or less combined with the first—is the most differentiated. This interpretation is made more evident by the fact that annuals, which are generally regarded as more differentiated than perennials, occur only in groups characterized by the production of teeth and callosities. On the other hand, toothless taxonomic entities occurring exceptionally in annual groups can be regarded as reduced forms. I need not emphasize that I do not suppose the living species, regarded here as relatively primitive, to be the ancestors of the more advanced ones, but they may be similar to the presumed ancestors as far as the valves are concerned.

In addition to the characters of the valves, on which the lower taxonomic units are based, a vegetative character until now neglected proved to be very important and useful for separating two main groups of subgenus *Lapathum* as sections. These groups are: (1) the *Axillares*—characterised by producing regularly leafy axillary shoots which develop secondary inflorescences, often predominating the principal ones, the flowering and fruiting process therefore being practically unlimited; and (2) the *Simplices*, which have a single unbranched stem with a branching terminal inflorescence of limited flowering and fruiting

period. In genetic behaviour, also, these two groups show a very important difference. While the *Simplices* cross easily with each other and some also with the *Axillares*, there is no case of hybridization known within the *Axillares*. The importance of that division is still more evident from the fact that the geographical distributions of the two groups correspond with the morphological characters.

The *Axillares* have their principal area and their probably most important centre of development in North America and are, in contrast, completely lacking in Europe and the larger part of Asia. The section is represented in North America by the very polymorphic subsection *Salicifolii*. Only one species of this subsection is extra-American, that is *R. sibiricus* in north-eastern Asia. Other members of that section are widely distributed over South America, and the rest are scattered over Australia, New Zealand, the Hawaiian Islands, south-western China, and South and Central Africa. Most of them are morphologically and geographically isolated from each other and very likely relics of ancient lines of development. A modification of the axillary type is no doubt represented by certain species with creeping rhizome-like stem, emitting axillary shoots. Species with this habit are found in South America, New Zealand and South Africa.

In the Section *Axillares* the shape of the fruiting perianth segments exhibits all the possibilities of this genus. The tendency to enlarge the surface is variously—sometimes exceedingly—prominent. *R. venosus* has the largest valves known. At the same time the nervation is developed very variously, strong or delicately graduated, or in nets of very different shape in the middle and on the border of the valves. The midrib is either not thickened (thus especially in the species with important developments of the surface of valves), or only little thickened, or transformed on one valve or on all three to a tubercle. Nevertheless, the characteristic shape and size of the tubercle and its proportion to the surface of the valve remain constant, within narrow limits for every species. The *Axillares* show little tendency toward dentation on the margins of the valves. It is developed considerably in one species only, the Australian *R. Brownii*, and in that to an extreme degree. Among the American *Axillares* only *R. californicus* shows small teeth.

Now to the second main group of *Lapathum*, the section *Simplices*. It is the larger one, and, besides the widespread weedy species already mentioned, includes others which are characteristic of every continent. The section is easily divided into natural groups in respect of the characters of the valves combined with the annual or perennial growth. Some of these groups show valves where only one of the above-mentioned main types is developed. Examples are the Subsections of *Hymenosepali*, *Densiflori*, *Alpini* and *Aquatici*. In these the valves are simply enlarged without any development of callosities or teeth. It is impossible to discuss in full all species of *Simplices*. Only groups show-

ing peculiarities of valve-development or geographical distribution will be mentioned.

The subsection *Hymenosepali* is monotypic; the only species, *R. hymenosepalus*, being confined to the south-western United States. The subsection *Densiflori*, in contrast, has a very large and very discontinuous area, several species being confined to the Rocky Mountains; a single species, very nearly related to these, is endemic in the high mountains of the western Balkan Peninsula. To the same subsection also belongs a plant well known under the name of *R. domesticus*, whose valid name is *R. longifolius* DC. It shows the unusual disjunction, Scandinavia—Scotland—Pyrenées Orientales, and very nearly related species have been found in Tibet and Korea. A very peculiar group of species agreeing with the former subsection in the entire valves without tubercles but differing in the gigantic habit and in the shape of the leathery leaves inhabits the mountains of Central and South America at an elevation of 9-14,000 ft., and so recalls the occurrence of equally gigantic representatives of the genera *Senecio* and *Lobelia* in the high mountains of tropical Africa. This group consists of *R. peruanus*, *R. tolimensis* and *R. costaricensis*. The last species attains a height of 15-20 ft., the stem measuring at the base 2-3 inches in diameter. It is by far the tallest plant among the docks.

The species forming the subsection *Aquatici* are extremely nearly related to each other so that they might even be united under one specific name. They inhabit swamp localities only and cover the northern temperate zone. At the northern limit of their area they merge into *R. arcticus*. *R. arcticus* itself is the only species of arctic circumpolar area. Only one species, very nearly related to the European *R. aquaticus*, occurs in the southern hemisphere, in western Patagonia near to the south end of S. America, thus adding a nearly antarctic area to the distribution of the subsection, and making it markedly discontinuous.

Another line of development leads to Subsection *Patientia*. The type of its distribution is Euro-Asiatic, and its members are confined to regions with a continental type of climate. The valves of this subsection enlarge their surface nearly to the same degree as in the subsections already discussed, but one or even more callosities are developed. Very short teeth occur in a few species only.

The subsection *Obtusifolii* furnishes good examples of various combinations of the two characters of callosity and dentation occurring within polymorphic species. *R. obtusifolius* is indigenous in Europe, except the Mediterranean region, and has been introduced into many other parts of the world. In Eastern Europe it is represented by ssp. *silvester* with small valves, all bearing a large callosity and very short teeth on the margin. In western Europe *R. obtusifolius* is represented by the contrasting ssp. *agrestis* with large valves, only one of them bearing a callosity, and with very pronounced teeth. In middle Europe the areas of these subspecies overlap and there frequently occur

intermediate forms not showing the characters usual in dock hybrids, such as diminished fertility. They are included under the name of ssp. *transiens*. In south-eastern Europe and western Asia the species is represented by ssp. *subalpinus*.

R. pulcher is as polymorphic as *R. obtusifolius*, the variability tending in the same directions. But its type of distribution is Mediterranean. The areas of its subspecies are not so clearly delimited, a fact perhaps due to the introduction of the ssp. *eupulcher* into the areas of other subspecies.

The subsection *Dentati* has a variability of the same type and the same degree as the last subsection, but differs obviously in the annual habit. The group consists of several species, all of them being inhabitants of wet or irrigated places in the tropics and sub-tropics. Remarkable is the occurrence of two subspecies, both characterised by very large callosities and small teeth, one on the banks of the Nile and the other along the Ganges and Brahmaputra—perhaps suggesting a connection between the development of callosities and the distribution by means of running water. In the New World the group is represented by two species in south-western North America and by two species in Paraguay and the Argentine.

The subsection *Maritimi* includes species of annual habit with small narrow valves bearing pronounced callosities and, usually, long and fine teeth. The group is widespread over the world and every continent has its own representatives. A very interesting fact is the occurrence of three species so similar that they would never have been described as species if not separated by thousands of miles—*R. garipensis* in South Africa, *R. comosus* in Egypt and *R. Marschallianus* in Southern Russia.

Till now the cytology has been studied of only a few species of *Lapathum*. There have been found extremely different numbers of chromosomes, some of them unusually high and, therefore, offering certain technical difficulties. Nevertheless, it is evident that certain basic numbers correspond with the main groups established by morphological researches.

It is clear that the study of this genus of world-wide distribution is of high interest. It shows, moreover, that by such comparative studies problems of general interest, such as those of evolution, of palaeogeography and palaeoclimatology may be resolved, especially when collaboration is established between cytology, genetics and the morphological method.

THE DISTRIBUTION AND ECOLOGY OF SCHEUCHZERIA PALUSTRIS L.

By W. A. Sledge.

During two weeks botanising based on the inn at Rannoch Station, Perthshire, in August 1946, my acquaintance with *Scheuchzeria palustris* on Rannoch Moor was renewed and an opportunity was afforded of making some observations on its local distribution and ecology. In recording these observations it seems appropriate also to bring up-to-date the facts relevant to the history of its occurrence in Britain and its distribution abroad.

BRITISH DISTRIBUTION

Druce (1932) records *Scheuchzeria* as having formerly occurred in six English counties and nine vice-counties. In Scotland it is cited from Perth and Argyll which now represent its only existing British stations, for, with the exception of one doubtful record, it has not been seen in any English locality for half a century. In 1904 Arthur Bennett collected together all the information then available about the past and present distribution of this species in Britain. Since then new information has accumulated and the following summary of the distributional history of *Scheuchzeria* in Britain is intended mainly to supplement and, where necessary, to correct and amplify the data in that paper. From this it will be seen that of the recorded English counties reliable evidence backed by herbarium specimens is only available for Shropshire, Cheshire, South-West and North-West Yorkshire. The records for South-East and Mid-West Yorkshire I consider erroneous, and those from Lincolnshire and Northumberland very unsatisfactory.

Shropshire (40)

J. Jeudwine's discovery of *Scheuchzeria* on the moss adjoining Bomere Pool near Shrewsbury in 1824 furnished the second locality for the species in Britain. He is also said to have found it at Shomere adjoining Bomere in the same year but no later reference to this locality is known. At Bomere the plant persisted for over 50 years, the last record of its having been seen there being in 1881. At Welshampton Moss O. M. Fieldon found three specimens in 1866. It had vanished from this station twenty years later but had presumably been seen there by Fieldon on other occasions subsequent to his discovery in view of his statement made in 1898, that he had not seen it there "within the last fifteen or twenty years." Another Shropshire station was added in 1884 when W. E. Beckwith, who knew the plant at Bomere and had been one of those who last saw it there three years previously, discovered it at Ellesmere. No further information is available about this station except that it was searched in vain for *Scheuchzeria* by E. F. Linton in 1892.

Probably *Scheuchzeria* was at one time widespread on the Shropshire mosses, for Hardy (1939) found fairly numerous remains of the stem and rhizomes at Fenn's Moss, embedded in *Sphagnum cuspidatum* near the base of the upper undecayed *Sphagnum* layer, and at Bettisfield one rhizome was found 190 cm. below the peat surface.

DISTRIBUTION OF *SCHEUCHZERIA PALUSTRIS* L.,
excluding dubious records.

North Lincoln (54)

Scheuchzeria is not included in Woodruffe-Peacock's *Check List of Lincolnshire Plants* (1909), but in a discussion of its occurrence at Thorne Waste in South-West Yorkshire (1921) he concluded that it probably grew on the Lincolnshire side of the county boundary which crosses the moor on the east side not far from the pools where it formerly grew in some quantity. It is known to have been present in more than one of these pools but, though the probability of its having once grown on both sides of the border is undeniable, no specimens or definite records from Lincolnshire are known. Peat cutting and warping led to its extermination long ago in this district.

Nottingham (56)

The former existence of the plant in Nottingham rests upon a report by M. J. Berkeley sent to H. C. Watson in 1844 recording its occurrence in a marsh—thought to have been Everton Carr—in the north of the county. No later record and apparently no specimens from this locality are known.

Cheshire (58)

In Cheshire it was first found at Wybunbury Bog in 1844 by G. Pinder, and there is a sheet in E. S. Marshall's herbarium at Cambridge collected there in 1895 though it was then already supposed to be extinct. Many botanists have since searched for it there without success.

South-East York (61)

The entry for the East Riding is based on specimens in the Col. Jas. Brodie collection in the herbarium at the Royal Botanic Gardens, Edinburgh, received from James Dalton and localised, apparently in Brodie's handwriting, "Found by Mr Dalton near Malton, Yorkshire." Terrington Carr (which is in v.-c. 62 not 61) was suggested by Bennett as the locality from which these specimens may have come, and this swamp, which at one time yielded the equally rare *Paludella squarrosa*, is certainly the most likely station in the Malton area to have produced *Scheuchzeria*. But the Carr was visited so frequently by botanists, including Richard Spruce, Matthew Slater, J. G. Baker and William Foggitt, before its partial drainage in 1860 led to the disappearance of some species, that it is impossible to believe they all overlooked the plant. As moreover no specimen from any station other than Leckby Carr exists in Dalton's own Collection at the York Philosophical Society and none other of the numerous gatherings distributed by Dalton bears this localisation, the supposed Malton station may surely be disregarded as an error probably caused by the transposition of labels.

South-West York (63)

In Lees' *Flora of West Yorkshire*, S. Appleby is credited with the first discovery of *Scheuchzeria* at Thorne Moor in 1832, but it is uncertain whether Appleby or Robert Harrison was the discoverer as both of them are now known to have collected the plant there in 1831. It was last seen on Thorne Moor in 1870 by F. A. Lees and W. Todd.

Mid-West York (64)

In the first supplement to *Topographical Botany* (1905), Mid-West Yorkshire was added as a new vice-county for *Scheuchzeria*. This record was based on a specimen in a fascicle of Don's Herbarium Britannicum issued in the early part of 1806, labelled " Marsh near Wetherby. Rev. J. Dalton." But apart from the evidence afforded by Dalton's own collection already referred to, there can scarcely be a doubt that Leckby Carr, which is situated some seventeen miles north of Wetherby, was the locality from which these specimens came. In the later years of the 18th and early part of the 19th century, Wetherby, situated on the Great North Road, was an important road centre where travellers changed stage coaches. " Near Wetherby " would therefore be a legitimate approximation implying, in the travel phraseology of the time, the nearest convenient point from which to start out; much as we should now say " near Thirsk " as indicating the nearest main line railway station of any size to which travellers from a distance would take train for Leckby.

North-West York (65)

Dalton's discovery of *Scheuchzeria* at Leckby Carr near Boroughbridge was the earliest British record for this species. The date of the discovery is given in the first edition of *English Botany*, and elsewhere, as 1787, but it would appear that Dalton did not realise the significance of his discovery until many years later. He evidently sent out neither specimens of nor information about the plant until nearly 20 years later, for no 18th century specimens from here are known and the species is not included in J. E. Smith's *Flora Britannica* (1800-1804). The oldest gathering in Dalton's collection at York is dated 1807. Numerous specimens have been distributed from this locality in which the plant persisted longer than in any of its other English stations. There are specimens from here collected in 1870 in the herbarium of the York Philosophical Society and it was gathered there the following year by George Webster of York. In Slater's *Flora of Ripon* published in 1881 it was stated to be then extinct, and a note on *Scheuchzeria* in one of F. A. Lees' manuscripts gives 1876 as the last year in which it was seen at Leckby.

In F. J. Lewis's ecological survey of the vegetation of the north Pennines (1904), *Scheuchzeria palustris* is listed as a constituent of *Molinia* grass heath near the Hunder Beck in Balderdale. It is somewhat surprising that it should be listed from this community and not from the *Sphagnum* bogs which Lewis describes from higher up the same dale. It is even more surprising that it should be included along with several other species as a " typical " member of this community without any qualifications as to frequency, when rare or infrequent members of other associations listed in the same paper are duly noted as such. These circumstances together with the inclusion of such improbable species from the area dealt with as *Ranunculus parviflorus*, *Ulex nanus* and *Vicia lathyroides*, and the citation of *Sesleria caerulea* as a component of *Nardus* heath in association with *Vaccinium Myrtillus*

and *Juncus squarrosus*, do not inspire confidence in the reliability of Lewis's determination. At the same time it must be conceded that the *Sphagnum* bogs of the Stainmoor region constitute what is probably the most likely area in England in which this species might yet be found.

Northumberland North (68)

I am indebted to Mr G. W. Temperley for the following information relative to the occurrence of *Scheuchzeria* in this county. Jas. Hardy (1889) quotes a letter from T. H. Archer-Hind of Newton Abbot, which appeared in *The Standard* of Feb. 12th, 1889, which runs "I have before me a dried specimen of *Scheuchzeria palustris* which was gathered four or five years ago in Northumberland. For obvious reasons I refrain from specifying the exact locality, but it was growing within a few hundred yards of the sea." A. H. Evans (1916) later wrote "This record is misleading. The present writer's old friend, Mr T. H. Archer-Hind informed him that only a single specimen was found "on a carriage drive at Beadnell Vicarage." How it got there is a mystery." And a mystery it still remains, with no subsequent record either from Beadnell (which is in vice-county 68 not 67 as given in the *Comital Flora*) or elsewhere in the county to support this slender claim for its inclusion in the Northumberland flora.

Mid Perth (88)

In Scotland *Scheuchzeria* was first found in the White Myre of Methven near Perth by Mr Duff in 1833. Here it was at one time abundant and many gatherings were made and distributed by John Sim. He collected it there for the last time in 1874 about which time a large colony of black-headed gulls settled in the bog bringing about a marked change in the vegetation. Herbarium specimens at Edinburgh dated 1877 are the latest known from this station.

At Rannoch Moor it was discovered by the late A. H. Evans in 1912, and this locality has since been visited by all who wished to see the living plant. As it may conveniently be seen not far from the road which terminates at Rannoch Station, probably few of the many botanists who have seen it here have troubled to walk further than necessary over this soaking moorland. In view of the large area of the moor and the innumerable lochans and permanently wet bogs situated between Rannoch Station and the south end of Loch Laidon, it seemed improbable that *Scheuchzeria* would be confined to the area adjacent to the road terminus and the opportunity afforded by staying in the vicinity enabled an extended search to be made over the moor. This expectation was soon confirmed for, in suitable habitats it proved to be widespread and indeed a characteristic component of many of the wettest *Sphagnum* bogs. South of the Gearr Ghaoir as far as the Dubh Lochan close to the Perth-Argyll border, it is distributed intermittently but I did not meet with it on the Argyll side of the border, either on the east side of Loch Laidon or on the moor between the two southern forks of the lake.

Argyll (98)

The rediscovery of *Scheuchzeria* in Scotland following its disappearance from Methven Bog was made by G. W. Scarth on July 18, 1910. A preliminary note recording its discovery on " Rannoch Moor " was followed by a longer notice (1911) in which the locality is not specified beyond the, no doubt intentionally, vague designation " Rannoch Moor in the Perth-Argyll area." That more precise information was sent to Druce is evident from the addition of Argyll to the note inserted by him in the current issue of this Society's Report (1911). In 1912 Druce distributed specimens through the Exchange Club. These were labelled " Moor of Rannoch, Argyll," and were said to be from Scarth's locality. Mr Chapple informs me that the label on Druce's own sheet of this gathering gives the locality as " Moor near Lochan a Claidheim, Argyll, 1150 ft." It is understandable that at this time security reasons should have prompted so misleading a localisation as that which appeared in Scarth's notes and on the labels of the distributed specimens. The natural assumption would be that the plant was found somewhere to the south of Loch Laidon, but the lochan in question which forms the meeting place of the Perth, Argyll and Inverness boundaries, lies at the head of the Blackwater Valley and only the broadest of interpretations could qualify it for inclusion in Rannoch Moor.

It was between this lochan and the head of the Blackwater Reservoir that Professor I. Manton, Dr E. M. Lind, Mr D. J. B. White and I saw *Scheuchzeria* growing in habitat conditions identical with those at Rannoch. The precise station was probably not the same as that in which Scarth and Druce had collected it. As similar expanses of bogland lie to the north of the Black Water further search between here and Corrour would doubtless establish its presence in Western Inverness.

EXTRA BRITISH DISTRIBUTION

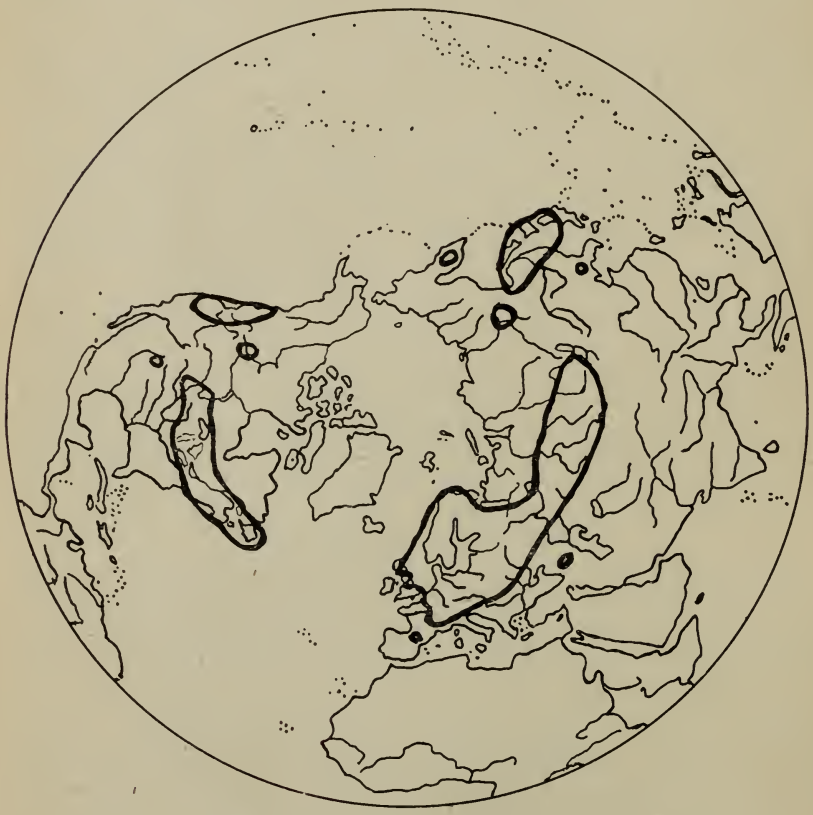
Scheuchzeria has a boreal circumpolar distribution. Its area lies mainly between latitudes 40°-60° N. though in Scandinavia and Finland it spreads north of the Arctic Circle. It is absent from Greenland and Iceland, from a wide area of continental North America and from parts of Eastern Asia.

In Europe it is found throughout Scandinavia, Finland and the Baltic countries southwards in often widely scattered localities through Belgium, Alsace, the Vosges, Jura, Dauphiné and Auvergne to the Pyrenees, and eastwards through south Tyrol, Hungary, north Rumania to the Ukraine, and thence, with a southern outlier in the Caucasus, to the Urals and into Asiatic Russia as far as Lake Baikal. A gap east of Lake Baikal may represent discontinuity in distribution or merely inadequate information about its eastern Siberian range.

In the far east it is recorded from Kamtchatka, the mountains of north and south Manchuria, the Amur Province, Sakhalin and the northern islands of Japan, Hokkaido and north Honshu, and the Southern Kurile Islands.

In America its area extends from Newfoundland west to Manitoba and in Central Alberta and south to New Jersey, Pennsylvania, Northern Ohio, Northern Illinois, Northern Iowa and Nebraska, with an outlier in New Mexico, and in Pacific N. America in British Columbia, Washington and California.

The accompanying map is based on that published by Hultén (1937) and shows the approximate limits of its world distribution. Within the areas delimited there exist many minor discontinuities.



ECOLOGY

Scheuchzeria palustris is always a plant of permanently wet bogs on peaty moors at low or moderate elevations. Its high and constant water requirements preclude its growth in any habitat subject to drying out during any part of the year and it is therefore one of the first species to disappear on drainage.

At Rannoch it grows in depressions on the undulating surface of the moor filled with spongy expanses of *Sphagnum* bog or open pools of water fringed by semi-floating mats of bog-moss and sedge. In such places *Scheuchzeria* is a frequent and characteristic species, usually on ground occupied by a continuous *Sphagnum* cover and very often partly submerged by the sides of runlet channels draining through the swamps, but sometimes growing on bare, black, semi-liquid, organic mud round the edges of peaty pools. The species most frequently associated with it are *Drosera anglica*, *D. rotundifolia*, *Menyanthes*, *Narthecium*, *Scirpus caespitosus*, *Eriophorum angustifolium*, *Carex lasiocarpa*, *C. limosa*, *C. pauciflora* and *C. rostrata* with *Sphagnum inundatum* and *S. papillosum*. A complete list from nine localities is given in the table appended. My thanks are due to Professor W. H. Pearsall, F.R.S., for supplying some of the data and for the identifications of the *Sphagna*. In 1, 4 and 8 an open substratum of black mud predominated. No *Sphagnum* collections were made from 7 and 9.

	1	2	3	4	5	6	7	8	9
Drosera rotundifolia		+	+		+	+	+		+
D. anglica		+	+	+	+	+	+		
Calluna vulgaris									+
Erica Tetralix		+							
Menyanthes trifoliata	+	+		+	+			+	+
Myrica Gale		+		+		+			
Narthecium ossifragum		+	+			+	+	+	+
Juncus bulbosus									+
Scheuchzeria palustris	+	+	+	+	+	+	+	+	+
Potamogeton polygonifolius	+								
Scirpus caespitosus						+	+	+	+
Eriophorum angustifolium	+		+		+	+		+	+
Rhynchospora alba							+		
Carex rostrata		+	+		+				+
C. lasiocarpa	+	+		+					
C. limosa	+	+	+	+	+	+	+	+	
C. curta							+		
C. echinata							+		
C. pauciflora			+		+		+		
Agrostis canina							+		
Equisetum limosum	+								
Sphagnum cuspidatum var. *plumosum*		+	+						
S. cymbifolium					+				
S. imbricatum		+	+		+				
S. medium					+				
S. papillosum		+	+		+	+		+	
S. amblyphyllum						+			
S. rubellum			+						
*S. inundatum**	+	+	+	+	+	+		+	
S. tenellum			+						

*Including vars. *robustum* and *cristatum*.

Of the flowering plants associated with *Scheuchzeria*, *Carex limosa* was particularly noticeable. Only once was the former found without the sedge, and it very soon became evident that it was unprofitable to look for *Scheuchzeria* where *C. limosa* was not present. The constant

association of these two species is not only a feature of the existing Scottish stations but also applied to the former localities at Leckby Carr, Thorne Moor, Wybunbury Bog and Bomere: indeed the essentially identical ecological nature of all the British stations for *Scheuchzeria* is indicated by the recurrence of the same species in all its scattered stations as shown in the following table: —

	Bomere.	Wybunbury.	Thorne.	Leckby.
Drosera rotundifolia	+	+	+	+
D. anglica		+	+	+
Menyanthes trifoliata	+	+	+	+
Narthecium ossifragum	+	?	+	?
Rhynchospora alba	+	+	+	+
Carex rostrata	+	+	+	+
C. lasiocarpa	+	+*	+	
C. limosa	+	+*	+	+

*Recorded by Druce (1907), not in *Flora*.

These species invariably accompany *Scheuchzeria* in its continental stations, and none more constantly than *Carex limosa* and *Rhynchospora alba*: Hegi (1906) adds " especially *C. limosa* " to his list of associates, and all save *Narthecium* are regular co-partners in the *Sphagnum* bogs of Central Russia, described by Katz (1926). Rannoch Moor is somewhat exceptional in that *Rhynchospora* is a rare plant which was only seen there in small quantity in one bog.

The disappearance of *Scheuchzeria* from all its English stations, though greatly accelerated by human interference, and especially by drainage, is probably not solely due to this cause but in part to the normal successional changes in the *Sphagnum* bogs it inhabits resulting from the accumulation of organic matter and consequent development of relatively dryer habitat conditions, and also partly perhaps to post-glacial climatic changes. This is attested by the occurrence already referred to of stems and rhizomes in two Shropshire mosses, in one of which the remains were found over six feet beneath the present peat surface. Clapham and Godwin (1918) have recently found it in abundance in the peat of the Somerset levels where it must formerly have been extremely common and an important peat-forming plant. In Denmark, also, where *Scheuchzeria* is now a plant of great rarity, Jessen (1935) has described peat deposits in north Jutland in which remains of the plant are so abundant as to form " *Scheuchzeria* peat " at an horizon attributed to sub-Atlantic age. Other *Scheuchzeria*-peat deposits have been described from Holland (Eshuis, 1946), north-west Germany (Overbeck and Schneider, 1938), southern Bavaria (Paul and Ruoff, 1927), Württemberg (Bertsch, 1930) and Baden (Broche, 1929).

The extreme rarity of *Scheuchzeria* in Britain makes any further ecological comparison of its habitats impossible and we must look abroad for further information as to its requirements and associates. Nordhagen's (1943) recent ecological survey of Norwegian mountain vegetation contains some interesting data relating to *Scheuchzeria* which he regards as a characteristic species of very oligotrophic acidophil

Sphagnum-rich grassmoors developed on topographically determined moorlands with a high water table. Nordhagen classifies the Norwegian grassmoors into five types, viz., three eutrophic-mesotrophic and two mesotrophic-oligotrophic types; the former developed on relatively fertile, base-rich soils, the latter on soils poor in nutrients, poor in calcium and strongly acid in reaction. These mesotrophic-oligotrophic types, collectively referred to as *Scheuchzerietalia* or, popularly, as waste grass moors (ødegrasmyrer), and which correspond to the Swedish high moor (högmossar), are distinguished as " black moor " or *Stygio-Caricion limosae*, and " pale moor " or *Leuko-Scheuchzerion*. Species characteristic of *both* types of moorland are:—*Scheuchzeria palustris*, *Rhynchospora alba*, *Carex limosa*, *C. paupercula*, *C. lasiocarpa*, *C. rostrata*, *Eriophorum angustifolium*, *Drosera anglica*, *Menyanthes*. The first two species occur principally at lower elevations, being near their climatic limits in the subalpine zone. Species with an increased concentration in the *Stygio-Caricion limosae* and regarded as distinguishing species for this formation are, in the lower regions, *Rhynchospora fusca*, *Drosera longifolia*, *Lycopodium inundatum* and *Utricularia intermedia*; and from the lowlands to the mountains, *Juncus stygius*, *Carex livida* and *C. chordorrhiza*. Most typical of the *Leuko-Scheuchzerion* are *Eriophorum vaginatum*, *Scirpus caespitosus*, *Carex pauciflora* and *Rubus Chamaemorus*.

The type of vegetation in which *Scheuchzeria* occurs in Norway and the plants associated with it are thus closely parallel to those in Britain. The general features of a *Scheuchzeria* moor are strikingly brought out in the following descriptive passage (p. 519) by Nordhagen. " Linné, who had great talent at expressing the habitats of plants in striking Latin words, used the adjective *stygius* for individual moor plants which occur in desolate and frightening, often dangerous moors. The word is derived from the Styx, the river of the underworld, and in using the same word for the name of the formation I have done so because the most characteristic formations undoubtedly affect the beholder in the same way that they did Linnaeus. Peculiar and mysterious like no other moorland, often black or dark brown in colour, with striking species of undoubtedly high geological age (*Scheuchzeria palustris*, *Rhynchospora* spp., *Lycopodium inundatum*, etc.) these grass moors affect the imagination of the investigator more strongly than many a flowery meadow." Those who have traversed the sodden wilderness of Rannoch Moor will know how well the description fits!

The American *Scheuchzeria palustris* is varietally distinct from the European, differing in its longer follicles and larger seeds. Fernald (1923) has distinguished it as var. *americana*. The differences, however, appear to be exclusively morphological, for ecological accounts of bogs in which *Scheuchzeria* grows in eastern North America reveal a very close similarity both in edaphic conditions and associated species as compared with the habitats of the old world type. Thus in G. E. Nichols' (1918) account of the vegetation of northern Cape Breton

Island, Nova Scotia, *Scheuchzeria* is cited as characteristic of undrained *Sphagnum* bogs associated with *Sphagnum cuspidatum*, *S. pulchrum*, *Heleocharis*, *Carex limosa* and *Menyanthes*. Other species mentioned as growing with *Scheuchzeria* in peaty swamps fringing the low-lying margins of lakes include *Rhynchospora alba*, *R. fusca*, *Carex lasiocarpa*, *Scirpus caespitosus*, *Drosera longifolia* and *Lycopodium inundatum*.

Moore and Taylor's (1927) account of the vegetation of Mount Desert Island, Maine, depicts an essentially similar community of plants in undrained *Sphagnum* bogs. Here, on a *Sphagnum* cover in which *S. papillosum*, *S. pulchrum* and *S. Warnstorfii* are the dominant species, *Scheuchzeria* grows in company with *Rhynchospora alba*, *Scirpus caespitosus* var. *callosus*, *Carex rostrata*, *Drosera rotundifolia*, *D. longifolia* and other (non-British) species.

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NOTE ON THE CYTOLOGY OF SCHEUCHZERIA FROM RANNOCH MOOR

By I. Manton.

On the visit to the *Scheuchzeria* localities in early August 1946, described above by Dr Sledge, opportunity was taken of making some cytological fixings of roots from plants growing in their natural habitat in order to place on record the basic facts for authentic British material since a plant of this rarity might at any time become totally extinct and cytological observations thereafter be unobtainable. The fixatives used were 2BE and chrom-acetic-formalin.

As shown in the diagram, which is drawn on an enlargement of a photograph, the chromosomes are small, though there is a considerable range of size among them. The number is $2n = 22$.

The season was unfortunately too advanced for any observations to be made on meiosis, all the plants being past flowering and bearing only large green fruits.

Somatic chromosomes of *Scheuchzeria palustris* from a root fixed in half strength chrom-acetic formalin and stained in gentian violet. Magnification × 3000.

PLANT RECORDS

Compiled by E. C. Wallace.

Records are for the year 1947 when no date is given.
The following signs are used:—

§ before the *B.P.L.* number: to indicate that the paragraph contains information necessitating a correction in the annotated copy of the *Comital Flora*.
† before the *B.P.L.* number: to indicate that the plant is not a native species in the British Isles.
† before the record: to indicate a native species which is not native in the locality recorded.
* before the record: to indicate new vice-county records, not published previous to the year of the Report.
‡ before the record: to indicate records additional to the annotated copy of *Comital Flora*, published previous to the year of the Report.
[ ] enclosing a record: to indicate doubt as to the validity of the record, either of identification or locality.

§1/1. Clematis Vitalba L. *†73, Kirkc.; on coast near Knockbrex, 1947, H. Milne-Redhead.

1/1c. Clematis Vitalba L. var. Timbali Drabble. 10, Wight; this striking variant described in *Journ. Bot.*, *70*, 83 (1932), was again collected in a hedge at Thorley by Dr R. C. L. Burges, comm. J. E. Lousley.

†1/2. Clematis Viticella L. 21, Middx.; Scratch Wood, Edgwarebury, L. J. Johns, det. and comm. D. H. Kent.

2/2(8). Thalictrum umbrosum Butcher. 69b, Lake Lancs.; shores of Coniston Water at Water Park, 1947, R. Quirk, confirmed by A. J. Wilmott.

6/6. Ranunculus Lingua L. 15, E. Kent; abundant in the R. Beult, near Headcorn, 1947—the only known truly inland Kentish locality at the present time, F. Rose.

6/7h. Ranunculus Flammula var. petiolaris Lange ex E. S. Marshall. 108, W. Suth.; margin of Loch a Mhuilinn, south of Sandwood Bay, Cape Wrath, 1947, C. W. Muirhead, comm. Carlisle Mus. as *R. scoticus* E. S. Marshall.

6/22. Ranunculus trichophyllus Chaix. 21, Middx.; pools on Staines Moor and Shortwood Common, Staines, D. H. Kent.

6/23. Ranunculus Drouetii F. Schultz. 108, W. Suth.; stream by the church at Balnakeil, Durness, 1946, C. W. Muirhead, comm. Carlisle Mus.

6/28c. Ranunculus Baudotii Godron var. marinus (Fries) Druce. 96, E. Inverness; ditch near Beauly river, Windhill, Beauly, 1947, E. C. Wallace.

11/1. Aquilegia vulgaris L. †21, Middx.; meadow near Ruislip Common, probably a garden escape, S. Batko and D. H. Kent.

31/1. Corydalis claviculata (L.) DC. 24, Bucks.; Rowley Wood near Stoke Poges, J. M. B. King, det. and comm. D. H. Kent.

36/2. Barbarea verna (L.) Asch. 3, S. Devon; near Tavistock, 1946, C. West.

36/5. Barbarea intermedia Boreau. 1, W. Cornw.; near Redruth, 1946, C. West.

37/5. Arabis petraea (L.) Lam. 108, W. Suth.; shingle on River Dionard, R. B. Abell, det. A. J. Wilmott.

†42/9. Alyssum incanum L. 20, Herts.; near Letchworth, where tanks were parked for repair during the war, 1947, A. Gavin Jones, det. and comm. A. J. Wilmott.

§45/7. Cochlearia danica L. *†30, Beds.; East Hyde, on railway ballast, 1947, J. G. Dony, det. N. Y. Sandwith.

49/2. Sisymbrium Sophia L. †21, Middx.; abundant on a rubbish tip near Greenford, and on a road verge at Whitton Avenue East near Sudbury Hill, D. H. Kent: a single plant on a rubbish tip at Hanwell, B. Welch and D. H. Kent.

†49/4. Sisymbrium orientale L. S, Guernsey; frequent on L'Ancresse Common, 1947; not mentioned in the Flora but recorded in 1923 Supp., D. McClintock.

†49/5. Sisymbrium Irio L. 21, Middx.; this reappeared in June 1947 in the locality just outside the boundary of the City of London, where it was found by the late Mrs Evetts—cf. *B.E.C. 1945 Rep.*, 52, 1947—it is not on a bombed site, J. E. Lousley.

49/6b. Sisymbrium officinale (L.) Scop. var. leiocarpum DC. †21, Middx.; rubbish tip, Hounslow Heath, H. Banks and D. H. Kent: rubbish tip, Hanwell, J. E. Lousley and D. H. Kent: waste ground by Kew Bridge, D. H. Kent.

†52/1. Camelina sativa Crantz. 21, Middx.; rubbish tip, Hanwell, D. H. Kent.

54/4d. Brassica Rapa L. var. Briggsii Wats. 49, Caern.; Penisar-waen, 2 miles N.E. of Llanrug—here this annual Turnip was abundant in arable fields and from the similar colonising of fields as seen from a car it is believed that it is widespread in Caernarvonshire, J. E. Lousley, Dr C. West and J. E. Woodhead.

†54/16. Brassica juncea Coss. 21, Middx.; rubbish tip, Hanwell, N. Y. Sandwith and D. H. Kent, det. N.Y.S.: cultivated land, South Mimms and waste land, Arnos Grove; bombed site, West Ealing; canal bank at Cowley; banks of River Brent, Perivale; roadside at Sudbury Hill and in Hyde Park, D. H. Kent. 34, W. Glos.; Sharpness Docks, R. B. Abell, det. at Kew.

†54/18(2). Brassica integrifolia (West) O. E. Schulz var. carinata (A. Br.) O. E. Schulz. 17, Surrey; rubbish tip, Mortlake, 1941, N. Y. Sandwith [Ref. no. 3258].

†54/20. Brassica gallica (Willd.) Druce. 17, Surrey; Lower Birtley Farm, Witley, 1947, G. M. Ash, confirmed by A. J. Wilmott.

§†54/22. Brassica incana (L.) F. Schultz. 30, Beds.; Leighton Buzzard, 1947, T. Blundell and J. G. Dony, det. A. J. Wilmott.

55/2. Diplotaxis muralis (L.) DC. †70, Cumb. (district 3); garden weed at Blaithwaite House, Wigton, 1947, J. Parkin, comm. Carlisle Mus.

†61/24. Lepidium neglectum Thell. 17, Surrey; rubbish tip by the Thames at Mortlake, 1947, N. Y. Sandwith [Ref. No. 3202]. 21, Middx.; rubbish tip, Uxbridge Moor, D. H. Kent.

§65/1. Iberis amara L. *†47, Mont.; along railway line near Llandovey Junction, R. B. Abell.

†74/2. Bunias orientalis L. 22, Berks.; Didcot Station, a large clump beside the line, 1942, J. N. Mills.

75/1. Crambe maritima L. 70, Cumb. (district 2); sea-shore at Maryport, 1947, Mrs D. Blezard, comm. Carlisle Mus.

†76/3. Rapistrum rugosum (L.) All. 21, Middx.; cinder heap at foot of Horsenden Hill, Greenford, D. H. Kent.

93/1. Tunica prolifera (L.) Scop. S, Jersey; N. slopes of Quenvais, a patch with white flowers, 1947, D. McClintock.

98/3. Lychnis alba Mill. S, Guernsey; one plant only by Fort Doyle, 1947, Flora says "very rare," and quotes only stations in the south, D. McClintock.

§100/4. Cerastium arcticum Lange. *105, W. Ross; in mossy turf, Choinnish Mor, Beinn Eighe, E. C. Wallace: Coire Mhic Fhearchair, Beinn Eighe, R. Mackechnie.

102/8. Arenaria tenuifolia L. 6, N. Som.; Crook Peak, Mendip, J. E. Lousley (*Proc. Bristol Nat. Soc.*, *27*, pt. 3, 150, 1946).

103/1. Sagina nodosa L. 15, E. Kent; locally frequent on Greatstone dune-slacks, Romney—one of the two surviving localities in Kent (Sandwich is the other)—1947, F. Rose.

103/2. Sagina subulata (Sw.) C. Presl. 108, W. Suth.; rocks at Scourie, R. B. Abell, det. A. J. Wilmott.

103/7(2). Sagina filicaulis Jord. 3, S. Devon; Dawlish Warren, 1944, C. West, confirmed by H. Gilbert-Carter. 25, E. Suff.; allotments, Brantham, 1947, Miss B. Schafer, det. and comm. A. J. Wilmott.

†108/1. Claytonia alsinoides Sims. 69, Westm.; lane below Rus Mickle in Lyth, 1947, J. N. Mills. 76, Renfrew; near Kilmacolm, 1945 (*Glasgow Nat.*, *15*, 77, 1946).

†108/2. Claytonia perfoliata Donn. 23, Oxon; road in Oxford, growing on the angle between a wall and the footpath, 1943, J. N. Mills.

§111/2. Elatine hexandra (Lapierre) DC. *16, W. Kent; The Upper Lake, Bedgebury, 1947, R. A. Boniface, comm. F. Rose.

§112/12. Hypericum dubium Leers. 57, Derby.; a few plants on the bank of the R. Dove near Ashbourne, 1947, also in two other localities in the county, K. M. Hollick. See Linton, *Fl. Derbysh.*, 88, 1903, for doubted records. Remove brackets in *C.F.*—E.C.W.

112/12×14. Hypericum dubium Leers × H. perforatum L. 16, W. Kent; bank of River Medway near Cannon Bridge, Tonbridge, before 1939, J. P. M. Brenan, who gave directions by which it was refound in 1947, F. Rose.

†117/9. Malva parviflora L. 13, W. Sussex; West Dean, 1947, D. P. Young, det. A. J. Wilmott.

§123/1. Tilia platyphyllos Scop. *69, Westm.; several trees in Barrowfield Wood, near Kendal; time did not permit of adequate observations but the trees observed did not suggest that it was planted —cf. Wilson, *Fl. Westmorland*, 112, 1938, J. E. Lousley.

§124/1. Radiola linoides Roth. *47, Mont.; lane leading from main road up to the hills from Derwenlas, R. B. Abell.

127/4. Geranium pratense L. 15, E. Kent; grounds of Chilham Castle, D. H. Kent.

§†127/5. Geranium phaeum L. 16, W. Kent; Brasted Hill, Miss Burnaby-Atkins; 1947, seen by F. Rose and D. McClintock. *42, Brecon; Pen-isa-waen, about 4 miles from Brecon, 1947, T. V. Jones, comm. Nat. Mus. Wales. *76, Renfrew, Eaglesham, 1945 (*Glasgow Nat.*, *15*, 76, 1946).

127/7. Geranium pyrenaicum Burm. f. 15, E. Kent; roadside between Wingham and Ash, D. H. Kent.

128/2. Erodium moschatum (Burm.) L'Hérit. †16, W. Kent; side of orchard, Marden, 1946, C. West, det. J. E. Lousley.

132/1b. Oxalis Acetosella L. var. subpurpurascens DC. 5, S. Som.; hedgebanks at Edgcott and at Downscombe, 1947, C. T. Amherst.

†132/2. Oxalis corniculata L. 16, W. Kent; Platt Vicarage. S, Guernsey; not infrequent: in waste ground at Le Donit was a form much larger and stouter in all its parts, D. McClintock.

133/1. Impatiens Noli-tangere L. †17, Surrey; near Felbridge Lake on both banks of a stream, 1947, B. M. C. Morgan, this locality not mentioned in C. E. Salmon's *Flora of Surrey*, but cf. Wolley-Dod, *Fl. Suss.*, 100-101.—E.C.W.

†133/4. Impatiens glandulifera Royle. S, Guernsey; near Bailiffs Cross, 1947, D. McClintock.

§149/3. Ulex minor Roth. 56, Notts.; Budby South Forest, 1947, J. Brown. *70, Cumb.; Kingmoor, Carlisle, 1947, C. W. Muirhead, comm. Carlisle Mus.

†154/4. Melilotus indica (L.) All. S, Guernsey; a good patch on the W. side of L'Ancresse Common, 1947—the *Flora* records only a single specimen from the island, in 1894, D. McClintock.

155/7d. Trifolium arvense L. var. longisetum (Boiss. & Bal.) Boiss. †30, Beds.; Eaton Socon Gravel-pit, D. Pigott, det. and comm. J. E. Lousley.

155/11. Trifolium striatum L. 45, Pembr.; near Haverfordwest, 1947, Miss E. Booth, comm. A. J. Wilmott. 49, Caern.; Little Orme's Head, May 1947, Miss W. Frost: mainland, opposite Bardsea, June 1947, Miss B. M. C. Morgan.

†155/15. TRIFOLIUM HYBRIDUM L. S. Guernsey; L'Ancresse, 1947—*Flora* says " Very rare "! D. McCLINTOCK.

155/18. TRIFOLIUM SUFFOCATUM L. S. Guernsey; L'Ancresse Common, quite frequent—the *Flora* says " Very rare apparently, but . . . very easily overlooked ", 1947, D. McCLINTOCK.

†155/32. TRIFOLIUM CONSTANTINOPOLITANUM Ser. 39, Staffs.; a single plant, Burton-on-Trent, R. C. L. BURGES, det. and comm. J. E. LOUSLEY.

†160/1. LOTUS SILIQUOSUS L. 18, S. Essex; Hockley, 1947, S. T. JERMYN, comm. A. J. WILMOTT.

160/6. LOTUS TENUIS W. & K. †21, Middx.; waste land between Hanwell and Southall, D. H. KENT.

†163/1. GALEGA OFFINALIS L. 70, Cumb. (district 3); L.M.S. station field, Penrith, 1947, W. DAVIDSON and W. ATKINSON, comm. CARISLE MUS.

176/4. VICIA OROBUS DC. 103, Mid Ebudes; roadside by Loch Cuan, near Dervaig, Isle of Mull; confirms record without locality given by the excursion to Mull (*B.E.C. 1939-40 Rep.*, 249, 1942), Mrs J. S. MUIRHEAD, comm. CARLISLE MUS.

185/57. RUBUS QUESTIERII Lef. & Müll. 3, South Devon; Yennadon Moor, Yelverton, 1946, C. WEST, det. W. WATSON.

187/2. GEUM RIVALE L. 108, W. Suth.; along S. bank of Loch Borralie, Durness, R. B. ABELL.

187/2×1. GEUM RIVALE L. × URBANUM L. 64, M.W. Yorks.; lane by Austwick Beck, with both parents, J. N. MILLS. 69, Westm.; edge fo Barrowfield Wood near Kendal, J. E. LOUSLEY, C. WEST and J. E. WOODHEAD.

§190/2. ALCHEMILLA XANTHOCHLORA Rothm. *30, Beds.; Luton Hoo, 1947, P. TAYLOR and J. G. DONY, det. S. M. WALTERS.

§190/4(2). ALCHEMILLA FILICAULIS Buser. *93, N. Aberd.; with *A. glomerulans* Buser near river between Edinglassie and Huntley, 1938, A. H. G. ALSTON, det. S. M. WALTERS.

§190/9. ALCHEMILLA ACUTIDENS Buser. *98, M. Argyll; lower rocks of Beinn Laoigh, 1931, A. J. WILMOTT (3859, 3860B).

191/1. AGRIMONIA EUPATORIA L. 21, Middx.; three plants in Hyde Park near Knightsbridge, D. H. KENT.

193/4. Poterium officinale (L.) A. Gray. 21, Middx.; still plentiful in the wilder parts of Ealing Golf Course at Perivale, D. H. Kent.

194. Rosa. All specimens determined by Dr R. Melville.

194/14e. Rosa micrantha Sm. var. septicola (Déségl.) Gren. 41, Glam.; Lime Quarry, Newton Nottage, M. Thomas, 1944, comm. E. Vachell.

194/19a. Rosa tomentosa var. typica Christ. 41, Glam.; hedge, Duffryn, 1943, E. Vachell; Kenfig Hill and Cornelly, 1944, M Thomas, comm. E. Vachell.

194/19f. Rosa tomentosa Sm. var. scabriuscula Sm. 41, Glam.; Nash Point, E. Vachell.

194/19f. Rosa tomentosa Sm. cf. f. moretonensis W.-D., *B.E.C. Rep.*, 162, 1932. 41, Glam.; Lime Quarry, Newton Nottage, 1944, M. Thomas, comm. E. Vachell.

194/20e. Rosa Sherardi Davies var. pseudo-mollis (E. G. Baker) W.-Dod. 41, Glam.; Kenfig Hill, M. Thomas, 1943, comm. E. Vachell.

195/16. Mespilus germanica L. †21, Middx.; two trees near Staines Moor, B. Welch, comm. D. H. Kent.

199/10. Saxifraga hypnoides L. agg. 105, W. Ross; mossy ground, Choinneach Mor, 3000 ft., Beinn Eighe, E. C. Wallace.

203/2. Chrysosplenium oppositifolium L. 18, S. Essex; Little Baddow Common—a rare plant in Essex—1947, F. Rose.

§211/1b. Sedum Fabaria Koch. *94, Banff; heathland, Clochan, 1947, Miss M. McCallum Webster, det. A. J. Wilmott.

211/7. Sedum album L. S, Guernsey; east side of L'Ancresse Common, 1947—*Flora* says "very rare," and records it on the west, D. McClintock.

216/2. Myriophyllum alterniflorum DC. S, Guernsey; in masses in a quarry lake near Vale Church, 1947, D. McClintock.

216/3. Myriophyllum verticillatum L. 21, Middx.; abundant in a backwater of the Paddington Canal north of Southall, D. H. Kent.

217/2. Callitriche obtusangula Le Gall. 15, E. Kent; Willesborough Lees: Ham Fen: Wingham Fen:—all fruiting—1947, F. Rose.

§217/7. Callitriche truncata Guss. *15, E. Kent; Dungeness—in a freshwater artificial lake, abundant and fruiting—1947, F. Rose.

220/1. Epilobium angustifolium L. 108, W. Suth.; cliffs above Sandwood Bay, 1947, C. W. Muirhead, comm. Carlisle Mus.

220/7×4. Epilobium obscurum Schreb. × parviflorum Schreb. 41, Glam.; St Fagans, 1941, E. Vachell, det. G. M. Ash.

§†220/7(2). Epilobium adenocaulon Hausskn. *41, Glam.; Cardiff Castle and gardens in Cardiff, 1947, A. E. Wade: grounds of Rookwood Hospital, Llandaff, 1942, E. Vachell, det. G. M. Ash.

220/9×10. Epilobium lanceolatum Seb. et Maur. × montanum L. 17, Surrey; weed in experimental ground, the Herbarium, Kew Gardens, 1947, N. Y. Sandwith [No. 3220], confirmed by G. M. Ash.

220/10×8. Epilobium montanum L. × roseum Schreb. (×E. heterocaule Borbás). 41, Glam.; Duffryn gardens, 1942, E. Vachell, det. G. M. Ash.

220/13×14. Epilobium alpinum L. × palustre L. 96, E. Invern.; shingle in stream bed, Glen Affric, 1947, E. Vachell, det. G. M. Ash.

†220/17. Epilobium pedunculare A. Cunn. 41, Glam.; thoroughly naturalised on cliff face by small waterfall on a mountain between the Rhondda and Ogmere Valleys at an elevation of approximately 800 ft. associated with *Chrysosplenium oppositifolium*, *Hypericum elodes*, etc.; no habitation within sight, 1947, E. Vachell, 48, Mer.; Blaenau Festiniog, 1947, Miss L. W. Frost, det. A. J. Wilmott: near old mine-workings high up in Cwm Nantcol, 1944, J. N. Mills, det. J. P. M. Brenan: Craig y Benglog, at 1000 ft. alt., 1947, Students, Dept. of Botany, U.C.W., Aberystwyth, per E. Price Evans, comm. Nat. Mus. Wales. 49, Caern.; in abundance at 2000 ft. alt., Moel Siabod, 1947, Evan Roberts, comm. Nat. Mus. Wales. 62, N.E. York.; on Blue Bank, Sleights, near Whitby, in wet moss, 1947, T. Cockerline, det. and comm. A. J. Wilmott. 64, Mid-W. Yorks. (L.); in crevices of a damp gritstone retaining wall in the village, Higher Bentham, 1947, D. P. Young, det. A. J. Wilmott.

239/1. Eryngium campestre L. 12, N. Hants.; still survives near its old site near Worthing Down, Winchester, which has been ploughed up, 1947, R. Quirk.

§261/2. Anthriscus Scandix (Scop.) Asch. *45, Pembr.; road banks round St David's, frequent, 1947, C. L. Collenette.

265/5. Oenanthe silaifolia Bieb. 17, Surrey; abundant near the R. Eden, east of Lingfield, 1947, F. Rose.

§†276/5. Peucedanum Ostruthium Koch. *76, Renfrew; Eaglesham, 1945 (*Glasgow Nat.*, *15*, 76, 1946).

†277/1. Hieracleum Mantegazzianum Somm. & Lev. 21, Middx.; very abundant on both banks of the River Brent for six or seven miles from Park Royal through Perivale to Greenford, Ealing and Hanwell, D. H. Kent.

§†296/12b. Galium spurium L. var. Vaillantii DC. *29, Cambs.; allotments near Ely, Miss M. S. Campbell and N. D. Simpson, directed by Prof. C. E. Raven.

300/1. Sherardia arvensis L. 62, N.E. Yorks.; conspicuously white flowered, arable land near Cowesby, Thirsk, C. M. Rob and E. C. Wallace.

304/4. Valerianella carinata Loisel. 16, W. Kent; waste ground, Ditton, C. West.

†312/5. Solidago serotina Ait. 4, N. Devon.; between Stag's Head and Aller Cross, E. M. Kelly (det. at Kew) (1946: *Rep. and Trans. Devon. Assoc., 78,* 58).

§†320/3. Erigeron canadensis L. *88, M. Perth.; garden weed, Easter Tegarmuchd, parish of Dull, 1947, M. S. Campbell—probably introduced with alpine plants removed from Layer Marney Hall (Essex) garden in 1946. *S, Guernsey; one plant at Cobo and one elsewhere, 1947, apparently hitherto unrecorded for the island, D. McClintock.

§†327/1. Anaphalis margaritacea (L.) C. B. Clarke. *22, Berks.; rough ground near the roadside, ½ mile above Letcombe Bassett, 1947, J. W. Gough: *43, Rad.; Upper Goytre, Beguildy parish, 1947, A. T. Hunt, comm. Nat. Mus. Wales.

†328/6. Gnaphalium undulatum L. S; now widespread over Guernsey and Jersey, although not mentioned in the *Flora*: recorded in *B.E.C. 1923 Rep.*, 188, 1924, D. McClintock.

†333/1. Inula Helenium L. 46, Card.; railway bank near Trawscoed Station, R. B. Abell. 69, Westm.; Glenridding, Ullswater, new to district 4, 1947, Mrs H. Stewart, comm. Carlisle Mus.

†333/3. Inula Britannica L. 55, Leics.; appears to be extinct at Cropstone Reservoir—for 48 in *C.F.* read 55, T. G. Tutin.

334/1. Pulicaria dysenterica (L.) Bernh. 70, Cumb.; Cowrigg, Ivegill, new to district 3, 1945, E. Blezard, comm. Carlisle Mus.

†339/4. Ambrosia trifida L. 30, Beds.; Tempsford, 1947, Mrs B. Reynolds, comm. J. G. Dony.

†345/2. Rudbeckia hirta L. 17, Surrey; a single plant in an arable field, Headley Lane, 1947, F. T. Vallins, det. W. R. Philipson, comm. A. J. Wilmott.

†347/4. Helianthus annuus L. 21, Middx.; Hanwell Tip (the usual large cultivated form), 1947, J. E. Lousley. 28, W. Norf.; in drills of carrots sown from " lease-lend " seed, near Thetford, 1945, R. Libbey—small flowered, branched and less stout plants, similar to those found wild in U.S.A.—det. J. E. Lousley.

†354/2. Galinsoga quadriradiata Ruiz & Pav. 9, Dorset; garden weed, Swanage, R. B. Abell, det. A. J. Wilmott.

†360/1. Schkuhria pinnata (Lam.) Cabera. 30, Beds.; railway siding, Flitwick, 1947, P. Taylor and J. G. Dony, det. N. Y. Sandwith.

†371/3. Matricaria suaveolens (Pursh) Buch. S, Guernsey; frequent by roadsides, etc., but apparently not yet recorded for the Bland, 1947, D. McClintock.

†372/3. Cotula coronopifolia L. 58, Cheshire; at the old locality at Leasowe material is being dumped rapidly in the depressions behind the sea-wall and at the time of our visit (1947) this dumping was within a few yards of the habitat of the plant; at the rate at which it was progressing this interesting alien is likely to be lost, J. E. Lousley, C. West, and J. E. Woodhead.

†372/11. Cotula australis Hook. f. 3, S. Devon; Newton Abbot, T. Stephenson (1946: *Rep. and Trans. Devon. Assoc., 78*, 63).

378/1. Artemisia Absinthium L. S, Guernsey; Grand Camp, 1947, D. McClintock. †15, E. Kent; Pegwell Bay, on beach, F. Rose: behind Broadstairs, L. W. Wilson;—very rare indeed in Kent—comm. F. Rose.

§†380/3. Petasites fragrans (Vill.) C. Presl. *75, Ayr; Skelmorlie, 1945 (*Glasgow Nat., 15*, 77, 1946).

383/7×8. ×Senecio londinensis Lousley. 63, S.W. York.; dry cinder of railway embankment, between Woodhouse Mill and Beighton, with parents, 1947, J. Brown.

383/7×10. Senecio squalidus L. × S. vulgaris L. 14, E. Sussex; one very large plant in Terminus Road, Eastbourne, R. P. Libbey, comm. J. E. Lousley

383/10e. Senecio vulgaris L. var. radiatus Koch. 33, E. Glos.; near Cheltenham, 1947, Miss D. E. de Vesian, comm. A. J. Wilmott. 58, Ches.; Marple, 1947, L. N. Kidd, det. and comm. A. J. Wilmott. 63, S.W. York.; neglected garden, Southey Green Estate, Sheffield, 1947, J. Brown.

383/32. Senecio integrifolius (L.) Clairv. 15, E. Kent; Burham Downs—refound here in quantity (in its only known Kent station) after a lapse of about twenty years—1947, F. Rose.

†395/1c. Carduus nutans L. var. macrocephalus (Desf.). 17, Surrey; railway embankment, West Weybridge, 1945, J. A. Whellan, det. W. A. Sledge, comm. J. E. Lousley.

396/8b. Cirsium arvense (L.) Scop. var. mite Koch. 57, Derby; in a cornfield at Bradley, with intermediate plants connecting it with the common form, 1945, K. M. Hollick, det. at Kew.

§†399/1. Silybum Marianum (L.) Gaertn. *27, E. Norf.; Slipper Bottom, 1947, A. E. Ellis—but see Nicholson, 1914, *Fl. Norfolk*, 103, for earlier records.—E.C.W.

401/1. Saussurea alpina (L.) DC. 73, Kirkc.; found by Dr H. Milne-Redhead on the cliffs of Merrick, 1947, see *B.E.C. 1943-4 Rep.*, 733 (1946), E. C. Wallace.

416/9. Crepis foetida L. 15, E. Kent; refound in quantity near Dungeness, where it was last found by N. Y. Sandwith about 1932—the only recent Kent record for this species—F. Rose.

421/3. Hypochoeris glabra L. 6, N. Som.; the status of this plant in the Bristol area is discussed by C. I. Sandwith (1946; *Proc. Bristol. Nat. Soc.*, *27*, pt. 3, 152-153, who finds that all records are so far erroneous.

†425/8. Lactuca macrophylla (Willd.) A. Gray. 60, W. Lancs.; Preston Dock area, H. E. Bunker.

438/1. Vaccinium uliginosum L. 108, W. Suth.; rocks above the Bealach a Bhuirich at 1600 ft., Eddrachillis, 1947, C. W. Muirhead, comm. Carlisle Mus.

444/1. Andromeda polifolia L. 70, Cumb. (district 1); at 1500 ft. near Blea Tarn, above Wythburn, 1947, Miss R. Bell, comm. Carlisle Mus.

441/2. Arctostaphylos alpina (L.) Spreng. 108, W. Suth.; rocks above the Bealach a Bhuirich, at 1600 ft., Eddrachillis, 1947, C. W. Muirhead, comm. Carlisle Mus.

447/1. Loiseleuria procumbens (L.) Desv. 108, W. Suth.; dry, rocky slopes above the Bealach a Bhuirich, 1600 ft., Eddrachillis, 1947, C. W. Muirhead, comm. Carlisle Mus.

453/1. Pyrola rotundifolia L. 15, E. Kent; near Brook, C. N. Pope: about seven miles south of Canterbury, Mrs Bentley; shown to

me by the finders, 1947, F. Rose. 69, Westm. (district 5); Sandford Mire, near Warcrop—included in the *Comital Flora* but no authenticated record given in Wilson's *Fl. Westmorland*—R. W. Robson, comm. Carlisle Mus.

§456/1. Monotropa Hypopitys L. *52, Angl.; among *Salix repens*, Newborough Warren, 1947, A. P. Conolly, comm. T. G. Tutin. 65, N.W. York.; near Quarry Gill, Masham, 1947, R. Chislett (Joyce Ridgway, 1947: *Naturalist*, No. 823, 158).

457/2. Limonium humile Mill. 18, S. Essex; abundant in the saltmarshes east of Bradwell and Tillingham, 1947, F. Rose.

457/3b. Limonium lychnidifolium (Girard) O. Kze. S, Jersey; St Ouen's Bay, 1947, just behind the concrete sea-wall built by the Germans, D. McClintock, det. A. J. Wilmott; the var. corymbosum C. E. Salmon, not the tall form distributed from Plémont (see *B.E.C. 1929 Rep.*, 231).

§457/6. Limonium transwallianum Pugsl. *4, N. Devon; near Ilfracombe, H. W. Pugsley (1946: *Rep. and Trans. Devonshire Assoc.*, *78*, 53).

459/1. Hottonia palustris L. 21, Middx.; pools on Shortwood Common, Staines, D. H. Kent.

465/1. Trientalis europaea L. 70, Cumb.; between the rivers White Lyne and Black Lyne, Bewcastle, new to district 4, 1937, Lord Henley, comm. Carlisle Mus.

§468/1. Centunculus minimus L. *7, N. Wilts.; Wingfield, 1946, J. D. Grose.

478/1. Centaurium umbellatum Gilib., between var. subcapitatum (Corb.) Gilm. and var. fasciculare (Duby) Gilm. 1, W. Cornwall; Perranporth and Newquay, 1908, W. M. Rogers. 14, E. Sussex; downs west of Cuckmere Haven, 1926, A. E. Ellis: between Beachy Head and Cuckmere Haven, 1873, A. Bennett. 59, S. Lancs.; Hightown, 1898, J. A. Wheldon. All det. J. S. L. Gilmour, 1947, comm. A. E. Ellis.

478/1b. Centaurium umbellatum Gilib. var. fasciculare (Duby) Gilm. 4, N. Devon; Braunton Burrows, E. M. Holmes. H.27, W. Mayo; Mullarany, 1899, E. S. Marshall, det. J. S. L. Gilmour, 1947, comm. A. E. Ellis.

478/1c. Centaurium umbellatum Gilib. var. subcapitatum (Corb.) Gilm. 1, W. Cornwall; Cape Cornwall, 1919; St Just-in-Penwith, 1918; Carn Boel near Land's End, 1926, A. E. Ellis; Kynance Down,

1873, W. M. Rogers. 2, E. Cornwall; Crackington Cove, 1873, M. Blagg; Bude, 1882, W. M. Rogers. 41, Glam.; Newton Cliff, Gower, 1905, W. M. Rogers. 45, Pem.; Freshwater West, 1930, A. E. Ellis. 52, Anglesey; S. Stack Lighthouse, Holyhead, 1881, C. Bailey. 60, W. Lancs.; between Lytham and St Anne's, 1895, E. S. Marshall. All det. J. S. L. Gilmour, 1947, comm. A. E. Ellis.

478/1×2. Centaurium umbellatum Gilib. × C. littorale (Turner) Gilm. 60, W. Lancs.; between Lytham and St Anne's, 1895, E. S. Marshall, "probable hybrid," det. J. S. L. Gilmour, 1947, comm. A. E. Ellis.

478/4. Centaurium pulchellum (Sw.) E. H. L. Krause. S, Jersey; St Ouen's Bay, 1947, D. McClintock—cf. Lester-Garland (1903: *Fl. Jersey*, 122), who said it was no longer there.

491/1. Cynoglossum officinale L. 57, Derbs.; flowers white with bright deep pink corolla scales, Markland Grips, 1947, J. Brown.

497/2. Symphytum tuberosum L. †21, Middx.; a large well established patch on Stanmore Common, D. H. Kent.

†500/1. Anchusa sempervirens L. 52, Angl.; shingle on Gallows Point, near Beaumaris, 1942, D. P. & J. A. Young.

507/3. Lithospermum arvense L. 33, E. Glos.; rubbish dump, Bussage, near Stroud, R. B. Abell.

†511/2. Calystegia sylvestris (Willd.) R. & S. 6, N. Somerset; Bath, 1938, Miss A. E. White. 36, Heref.; Longtown, 1947, H. M. Hallet. 43, Rad.; Kenneaton Road, New Radnor, 1938, J. A. Webb. 44, Carm.; Llandebie, 1944, J. A. Webb. 50, Denb.; Denbigh, 1938, A. MacKessack. 51, Flint.; Talacre, 1942, J. A. Webb. 55, Leics.; Braunstone, 1915, A. E. Wade. All comm. Nat. Mus. Wales.

†515/7. Cuscuta suaveolens Ser. 35, Mon.; on *Antirrhinum majus*, Glansychan Park, Abersychan, 1947, J. W. Barker, comm. Nat. Mus. Wales.

†519/1. Nicandra physaloides Gaertn. 16, W. Kent; potato field, Ditton, 1945, C. West, det. H. Gilbert-Carter.

†522/1. Datura Stramonium L. 17, Surrey; one plant on rubbish heap opposite Court Manor Farm, Horley, 1947, B. M. C. Morgan.

527/3. Verbascum Thapsus L. S, Herm; by White House Hotel, 1947; not recorded from Island of Herm in the *Flora*, but in the 1923 Supplement as "very rare," D. McClintock.

†527/4. Verbascum virgatum Stokes. 34, W. Glos.; Sharpness Docks, R. B. Abell, det. A. J. Wilmott.

527/7. Verbascum Lychnitis L. †21, Middx.; rubbish tip by the canal, Northolt, D. H. Kent.

527/8. Verbascum nigrum L. S, Guernsey; Rohais, recorded as "very rare" in the *Flora*: Sark; Stocks Hotel: Herm: all 1947, D. McClintock.

†532/2. Linaria purpurea (L.) Mill. 41, Glam.; Birchgrove, adventive, 1947, E. Vachell.

532/3. Linaria repens (L.) Mill. 21, Middx.; introduced with chalk ballast on to waste land by the canal near Greenford Green, D. H. Kent.

532/3×1. Linaria repens (L.) Mill. × vulgaris Mill. 30, Beds.; Harlington, 1947, P. Taylor and J. G. Dony. 46, Card.; lane from Llandoe to Wallog, R. B. Abell.

§532/7. Linaria minor (L.) Desf. *71, Isle of Man; "reported by R. Wagstaff per W. S. Cowin, near Peel Road Station" (C. I. Paton, 1946: Botanical Notes for 1945; *Journ. Manx Museum*, *5*, 188).

534/2. Antirrhinum Orontium L. 46, Card.; near shore at Aber Arth, R. B. Abell.

535/4b. Scrophularia nodosa L. var. Bobartii Pryor. 64, M.W. Yorks. (A.); in crevices of limestone pavement above Malham Cove, with *S. nodosa*, 1947, D. P. Young.

†537/1. Mimulus guttatus DC. 64, M.W. Yorks.; banks of Austwick Beck, just below Settle to Kirby Lonsdale road, 1947, J. N. Mills.

†537/2. Mimulus moschatus Dougl. 14, E. Suss.; Tilgate Forest, near (three miles from) Three Bridges, 1947, F. T. Vallens, comm. A. J. Wilmott.

540/1. Sibthorpia europaea L. 46, Carm.; banks of R. Cothi, Abergaslech, 1947, Miss D. Eastwood, comm. A. J. Wilmott.

†543/41. Veronica filiformis Sm. 5, S. Som.; hedgebank, Edgcott, 1947, C. T. Amherst, det. A. J. Wilmott.

545. Euphrasia. All specimens determined by the late H. W. Pugsley.

545/3. Euphrasia brevipila Burnat & Gremli. 41, Glam.; Mynydd-y-Glew, 1937, E. Vachell.

545/3b. Euphrasia brevipila Burnat & Gremli var. subeglandulosa Towns. 41, Glam.; Kenfig Hill, 1945, E. Vachell.

545/5d.. Euphrasia nemorosa Löhr var. collina Pugsl. 41, Glam.; Nantgarw; Morpha Pools, etc., E. Vachell.

545/18. Euphrasia confusa Pugsl. (f. albida Pugsl.). 41, Glam.; Sker and Rhossili, E. Vachell.

545/19(4). Euphrasia anglica Pugsl. 41, Glam.; Aberdulais, 1938, E. Vachell.

547/1. Pedicularis palustris L. 15, E. Kent; ditch banks at Worth Minnis—probably the only surviving Kent locality for the species —1947, F. Rose.

552/1. Utricularia vulgaris L. 21, Middx.; very abundant and flowering in a pond close to the Southern Railway, on Hounslow Heath, L. G. Payne, comm. D. H. Kent: abundant and flowering in a pond near the Government Training Centre on Hounslow Heath, D. H. Kent.

558/2. Mentha alopecuroides Hall. 15, E. Kent; Hothfield Heath—recorded erroneously in *B.E.C. 1945 Rep.*, 66 (1947), as *M. rotundifolia* L.: the Molash plant was correct—1945, F. Rose, det. R. A. Graham.

§558/11. Mentha cardiaca Baker. *12, N. Hants.; Micheldever, far from houses, 1943, C. West, det. A. L. Still, who wrote " I should say *M. cardiaca* Baker. A similar plant used to grow on Shalford Common, Surrey, near the pond on the east side not far from the station."

558/12. Mentha rubra Huds. 13, W. Suss.; ditch in lane, Ifold, near Plaistow, E. C. Wallace.

§561/10. Thymus neglectus Ronn. 22, Berks.; Upper Basildon: *33, E. Glos.; Cleeve Hill, 1946, C. C. Townsend, det. A. J. Wilmott.

561/11. Thymus britannicus Ronn. 33, E. Glos.; Cleeve Hill, Cheltenham, 1946, C. C. Townsend, det. A. J. Wilmott.

§573/2. Prunella laciniata L. *34, W. Glos.; limestone down, Tytherington, 1946, B. Welch.

§574/1. Melittis Melissophyllum L. *44, Carm.; by Gelligatti Wood near Newcastle Emlyn, 1947, D. James, comm. Nat. Mus. Wales.

576/1. Marrubium vulgare L. S, Jersey; by a cottage near the Quenvais, 1947, D. McClintock.

†581/2. Lamium maculatum L. 62, N.E. Yorks.; hedgebank, Bank Foot, Ingleby Greenhow, C. M. Rob and E. C. Wallace.

†596/4. Amaranthus chlorostachys Willd. 30, Beds.; railway siding, Flitwick, 1947, P. Taylor and J. G. Dony, det. N. Y. Sandwith.

†596/8. Amaranthus Thunbergii Moq. 30, Beds.; railway sidings, Flitwick, 1947, J. G. Dony, det. N. Y. Sandwith.

§600/2. Chenopodium botryodes Sm. 18, S. Essex; near Stansgate Abbey, Steeple (remove brackets in *C.F.*), 1947, F. Rose.

600/4. Chenopodium hybridum L. 9, Dorset; Woolbridge Manor, Wool, 1947, A. E. Ellis. 15, E. Kent; Wingham (near the Fen), 1947, F. Rose. 24, Bucks.; Beaconsfield, 1947, B. M. C. Morgan. 29, Cambs.; allotments, Ely, 1947, Miss M. S. Campbell and N. D. Simpson.

600/13. Chenopodium glaucum L. 15, E. Kent; still at Queenborough Goods Station—first seen there in 1938—1947, D. McClintock and F. Rose.

606/17. Obione portulacoides (L.) Moq. S, Jersey; behind concrete sea wall, St Ouen's Bay, 1947, D. McClintock.

612/1. Suaeda fruticosa Forsk. 18, S. Essex; in immense quantity, forming a thick scrub 3 ft. high, on the shell-beach between Bradwell and Soles Point, 1947, F. Rose.

612/2. Suaeda maritima (L.) Dum. S, Jersey; behind concrete sea wall, St Ouen's Bay, 1947, D. McClintock.

615/4. Polygonum viviparum L. 108, W. Suth.; hills near Kyle of Durness, R. B. Abell.

615/4b. Polygonum viviparum L. var. alpinum Wahl. 49, Caern.; at 2600 ft., Cwm Glas, Snowdon, 1947, Evan Roberts, comm. Nat. Mus. Wales, det. H. A. Hyde and A. E. Wade.

615/13. Polygonum Raii Bab. 15, E. Kent; locally plentiful on the shell-beaches N. of Leysdown and W. of Seasalter, 1947, F. Rose, B. Welch and D. McClintock.

†615/32. Polygonum Sieboldii De Vriese. S, Guernsey; near Hautland Hall, 1947, D. McClintock.

617/1. Oxyria digyna (L.) Hill. 73, Kirkc.; cliffs of Merrick, 1947, H. Milne-Redhead.

618/9×13. Rumex conglomeratus Murr. × maritimus L. = ×R. Knafii Čelak. 29, Cambs.; damp waste ground, Barnwell, 1943, C. West, det. J. E. Lousley.

†618/18. Rumex Brownii Campd. 30, Beds.; railway siding, Shefford, 1947, J. G. Dony, det. J. E. Lousley.

§628/6. Euphorbia stricta L. *6, N. Som.; footpath connecting Barhampton and Warminster roads, 1947, A. L. & J. D. Miller, comm. A. J. Wilmott.

†628/11. Euphorbia Cyparissias L. 29, Cambs.; waste ground in Cambridge, 1946, J. N. Mills.

633/1. Ulmus glabra Huds. 15, E. Kent; abundant and looking native in calcareous ash-oak wood, on the Ragstone escarpment east of Lympne, 1947, F. Rose.

633/1×6. Ulmus glabra Huds. × U. stricta Lindl. 3, S. Devon; Doddiscombsleigh, 1947, A. E. Ellis, det. R. Melville.

§633/4. Ulmus Plotii Druce. *16, W. Kent; Bromley, one medium-sized tree (presumably planted) in Hayes Road, 1947: *17, Surrey: Chelsham, about a dozen large trees (presumably planted) in hedgerows of two fields between church and Fairchildes, alt. 600 ft., 1946: 40, Salop; Mawleytown Farm, Wyre Common, Cleobury Mortimer, alt. 500 ft., one tall tree in front of farm house, 1943, H. K. Airy Shaw. [N.B.—This is very close to the border of v.-c. 37, Worcs., from which records of *U. Plotii* are still needed.]

633/6. Ulmus stricta Lindl. 3, S. Devon; Farrant's Hayes, Dunsford, 1947, A. E. Ellis, det. R. Melville; "a rather broad leaved form."

†639/1. Helxine Soleirolii Req. S, Guernsey; abundant on walls all over the island, 1947, D. McClintock, det. A. J. Wilmott—not mentioned in Marquand's Flora or McCrea's Supplement.

650/11c. Salix repens L. var. argentea (Sm.). 102, S. Ebudes; near Scalasaig, Isle of Colonsay, 1947, Mrs J. S. Muirhead: 108, W. Suth.; rocks on Loch na Claise, Kinloch Bervie, 1947, C. W. Muirhead, comm. Carlisle Mus.

650/16. Salix lapponum L. 106, E. Ross; many bushes on Mullach a Ghlas-thuill, alt. c. 2000 ft., Glen Cannich, E. C. Wallace.

655/1. Stratiotes aloides L. †21, Middx.; abundant and completely naturalised in two ponds on Little Common, Stanmore, D. H. Kent.

659/1. Hammarbya paludosa (L.) O. Kze. 70, Cumb. (district 1); above Scale Force, Buttermere, 1946, Miss J. Shearman, comm. Carlisle Mus.

§665/1. Goodyera repens (L.) R.Br. *109, Caithness; on a heathery and grassy bank a few yards from Loch nan Clach Geala, at c. 600 ft., four miles from Reay, J. W. Lawson (Keeper to A. D. Pilkington), comm. Mrs J. V. Phelps.

§667/1. Cephalanthera rubra L. C. Rich. Cancel the entry for v.-c. 8 in *B.E.C. 1933 Rep.*, 543, 1934; the specimen cited is *C. grandiflora*, E. C. Wallace.

668/2. Epipactis Helleborine (L.) Crantz. 21, Middx.; Whitewebbs Park, Enfield, a single plant, L. J. Johns, comm. D. H. Kent.

668/4. Epipactis purpurata Sm. 16, W. Kent; Langton Green, near Tunbridge Wells, 1947, Miss F. I. Williams: edge of beech wood, Knockholt, 1947, Miss Heather Zetton: both det. and comm. A. J. Wilmott. 34, W. Glos.; wood near Falfield, August 1947, Dr David Prowse—the first record for White's Bristol area—confirmed by V. S. Summerhayes, comm. N. Y. Sandwith.

669/6. Orchis pardalina Pugsl. 15, E. Kent; Wingham Fen: dunes North of Sandwich: marsh near Sandwich: Worth Minnis: Ham Ponds: Hacklinge:—*Orchis Fuchsii* Druce has not been observed in any of these localities, but hybrids between *O. praetermissa* Dr. and *O. pardalina* Pugsl. (confirmed by J. E. Lousley) have been seen at Wingham Fen, 1946-47—F. Rose.

669/8. Orchis praetermissa Druce. 59, S. Lancs.; Freshfield, 1947, Miss Pamela Jones, confirmed by A. J. Wilmott.

669/10. Orchis ericetorum (E. F. Linton) E. S. Marshall. 18, S. Essex; Galley Wood Common, 1947, F. Rose.

669/13. Orchis laxiflora Lam. S, Guernsey; still at Grande Mare, seen also in two spots on L'Ancresse Common, 1947, D. McClintock.

672/3. Ophrys apifera Huds. 70, Cumb. (district 1); limestone quarry near Cockermouth, 1947, J. D. Hinde, comm. Carlisle Mus.

674/1. Gymnadenia conopsea (L.) R.Br.—abnormal, with spur short, sometimes almost absent. 17, Surrey; calcareous downland adjoining Tyrell's Wood Golf Course, Leatherhead, 1947, T. J. Wallace, det. and comm. A. J. Wilmott—probably similar to specimen recorded by M. L. Lambert (1912: *Bull. Géogr. Bot.*, *22*, 159) from France.

674/4. Coeloglossum viride (L.) Hartm. 15, E. Kent; Ospringe, Mrs Verschoyle:—no previous Kentish record of this species for nearly twenty years—1947, comm. F. Rose.

674/6. Platanthera bifolia (L.) L. C. Rich. 30, Beds.; Potton Wood, 1947, F. L. Chesham, comm. J. G. Dony.

674(2)/1. Leucorchis albida (L.) E. Mey. ex Schur. 108, W. Suth.; at the head of Loch Glendhu, near sea level, 1947, Miss E. K. Shaw, comm. Carlisle Mus.

†680/1. Sisyrinchium angustifolium Mill. 20, Herts.; canal bank, Rickmansworth, a small clump, 1947, Mrs O. M. Richards, comm. A. J. Wilmott.

691/3. Polygonatum officinale All. 48, Mer.; on sand dunes at Mochras, abundant in one place 1939; still there but being swamped by bracken in 1947, B. M. C. Morgan.

§702/3. Allium Scorodoprasum L. *†3, S. Devon; Alston Ferrars, 1947, Col. C. R. Congreve, comm. A. J. Wilmott.

702/11. Allium Schoenoprasum L. 69, Westm.; Rus Mickle in Lyth; none could be found in this classic locality in 1947, and Mrs Mason, of Rus Mickle Farm, stated that after slowly diminishing it had disappeared about 1945, J. N. Mills.

703/1. Muscari racemosum (L.) Mill. 29, Cambs.; roadside, far from houses, Whittlesford, 1947, Mrs Armstead, det. C. West.

707/2. Ornithogalum umbellatum L. S, Guernsey; L'Ancresse Common, a few plants both in the centre and in the west, 1947—the *Flora* says "very rare," D. McClintock.

711/1. Gagea lutea (L.) Ker-Gawler. 70, Cumb. (new to district 1); copse near Brigham, Cockermouth, 1947, J. D. Hinde, comm. Carlisle Mus.

718/6. Juncus balticus Willd. 108, W. Suth.; Sandwood Bay, 1947, C. W. Muirhead, comm. Carlisle Mus.

§718/14. Juncus compressus Jacq. 105, W. Ross; sea-shore, with *J. Gerardi*, Ob Mheallaidh, Shieldaig, Upper Loch Torridon, E. C. Wallace.—cf. *Top. Bot. Supp. 2*, and remove brackets in *C.F.*

§†718/16. Juncus tenuis Willd. *60, W. Lancs.; Preston dock, H. E. Bunker. 70, Cumb. (new to district 4); in the path across Kingmoor, Carlisle, 1946, C. W. Muirhead, comm. Carlisle Mus.

§718/20. Juncus castaneus Sm. *105, W. Ross; Sgurr nan Ceathreamhnan, W. A. Sledge. *106, E. Ross; Mullach a Glas-thuill, E. C. Wallace.

§719/7. Luzula arcuata (Wahlenb.) Wahlenb. 105, W. Ross; Liathach, c. 3000 ft., 1947, R. Mackechnie. The record in Druce's *Flora W. Ross, 85*, 1929, from Mam Soul, A. H. Evans, 1904 (see *Top. Bot. Supp. 2*), should be credited to 106, E. Ross, for Mam Soul is on the boundary of v.-cc. 96 and 106, and the plant occurs in both. Add 106 to *C.F.*—E.C.W.

†719/9. Luzula luzuloides (Lam.) Dandy & Wilmott. 72, Dumfr.; naturalised in the now derelict grounds of the old Hydropathic, Moffat, near the ruins, 1947, Dr K. M. Braid, comm. A. J. Wilmott.

729/1b. Alisma lanceolatum With. 27, E. Norfolk; Thorpe St. Andrew, 1947, A. E. Ellis. 30, Beds.; Stevington, 1946, B. Verdcourt, comm. J. G. Dony.

730/1. Baldellia Ranunculoides (L.) Parl. 21, Middx.; sparingly in a pond on Finchley Common, and a single plant in a pond on Hadley Common, D. H Kent.

737/4. Potamogeton coloratus Hornem. 64, M.W. Yorks.; shallow ditch north of Foster Flat, by Newby Brook, E. C. Wallace.

737/5. Potamogeton alpinus Balb. 22, Berks.; river Cole near junction with Thames, Buscot near Lechlade, J. F. G. Chapple, det. J. E. Dandy.

737/18. Potamogeton compressus L. 57, Derby; Hall Pond, Ashbourne, first noticed several years ago, 1947, K. M. Hollick.

737/19. Potamogeton acutifolius Link. 21, Middx.; abundant in the lake on Shortwood Common, Staines, B. Welch, comm. D. H. Kent, confirmed by J. E. Dandy and G. Taylor.

737/20. Potamogeton obtusifolius Mert. & Koch. 21, Middx.; abundant in a lake on Little Common, Stanmore, D. H. Kent, det. J. E. Dandy and G. Taylor.

737/25. Potamogeton pusillus L. 21, Middx.; floating on the Round Pond, Kensington Gardens, D. H. Kent, det. J. E. Dandy and G. Taylor.

§737/27. Potamogeton trichoides Cham. & Schlecht. *15, E. Kent; found near Lydd in 1946, teste J. E. Dandy, comm. F. Rose. 21, Middx.; canal backwater north of Southall, D. H. Kent, det. J. E. Dandy and G. Taylor: lake on Shortwood Common, Staines, B. Welch and D. H. Kent, det. J. E. Dandy and G. Taylor.

§746/8. Scirpus pauciflorus Lightf. *S, Guernsey; L'Ancresse Common, 1947, D. McClintock, det. A. J. Wilmott—add to *C.F.*, but see Marquand, *Flora of Guernsey*, 188, 1901.

746/12b. Scirpus cernuus Vahl var. monostachys Clarke & Marshall. 2, E. Cornw.; damp, sandy ground at base of cliffs near Rame Head, 1946, C. West.

746/15. Scirpus rufus (Huds.) Schrad. 105, W. Ross; several spots on Upper Loch Torridon, very fine in marsh at Torridon, E. C. Wallace. 108, W. Suth.; edge of Kyle of Durness, R. B. Abell.

748/1. Rhynchospora fusca (L.) Ait. f. 6, N. Somerset; in quantity in a very limited area on the Somerset peat moor, in an enclosure far distant from Mr Graveson's locality (see *B.E.C. 1932 Rep.*, 275; and C. I. Sandwith in *Proc. Bristol Nat. Soc.*, 1946), probably a rediscovery of Dr Gapper's locality which had been lost for over a century (see White, *Fl. Bristol*, p. 616), 1947, C. I. and N. Y. Sandwith.

753/10. Carex pendula Huds. S, Guernsey; in the grounds of Vimiere, Rohais, possibly planted, 1947—the *Flora* says " Alien . . . very rare," D. McClintock.

753/11. Carex sylvatica L. 49, Caern.; Llanystumdwy, 1947, Miss W. Frost.

753/13. Carex helodes Link. 18, S. Essex; Little Baddow Common, 1947, F. Rose.

753/15. Carex binervis Sm. 24, [Beds.]; New Wavendon Heath, 1947, P. Taylor, confirmed E. Nelmes.

753/17×23. Carex distans L. × extensa Gooden., probably × *C. Tornabeni* Chiov. 6, N. Som.; Berrow salt-marsh, 1946, J. E. Lousley and C. West (*Proc. Bristol Nat. Soc.*, 27, pt. 3, 155, 1946).

753/20(2). Carex tumidicarpa Anderss. 21, Middx.; Stanmore Common and Ickenham Marsh, D. H. Kent, det. E. Nelmes.

753/22. Carex serotina Mérat. 15, E. Kent; by Open Pits, Dungeness:—it seems practically certain that all previous records for this species in Kent (as *C. Oederi* Retz.) really refer to *C. tumidicarpa* Anderss., as did my own from Willesborough Lees in 1944; I have only been able to find *C. tumidicarpa* in these old localities, so this is really a New County Record—1947, F. Rose, det. E. C. Wallace.

§753/24. Carex depauperata Curt. *52, Angl.; Holyhead, 1936, A. G. and F. W. Holder, comm. A. E. Wade.

753/53. Carex leporina L. 21, Middx.; Kensington Gardens, D. H. Kent.

753/56. Carex echinata Murr. 24, [Beds.]; New Wavendon Heath, 1947, P. Taylor, confirmed E. Nelmes.

§753/59(2). Carex vulpina L. *17, Surrey; in quantity east of Lingfield, near the River Eden, 1947, F. Rose, confirmed E. C. Wallace.

§753/61(2). Carex polyphylla Kar. & Kir. *30, Beds.; Whipsnade, J. G. Dony, det. E. Nelmes. 41, Glam.; Pendoylan, 1904, E. Vachell: Gigman, 1904, Illtyd Buller Pole-Evans.

753/63×57. Carex paniculata L. × remota L. 15, E. Kent; marsh near Westwell—the second record for the vice-county—1947, F. Rose.

§753/68. Carex divisa Huds. 16, W. Kent; Upnor, 1947, J. E. Woodhead and J. E. Lousley: this species is also abundant in marshes by the Thames as at Higham, Stone, Dartford, etc., and is duly included in *Top. Bot.* for v.-c. 16—the above record is sent to draw attention to the remarkable omission from *C.F.* of 15 and 16 (for v.-c. 15 see *Flora*), J. E. Lousley.

753/74. Carex pulicaris L. 21, Middx.; Stanmore Common, D. H. Kent.

†754/10. Digitaria sanguinalis (L.) Scop. 30, Beds.; railway siding, Flitwick, 1947, P. Taylor and J. G. Dony, det. C. E. Hubbard.

†756/2. Setaria viridis (L.) Beauv. 33, E. Glos.; rubbish dump, Gloucester, R. B. Abell, det. A. J. Wilmott.

†756/4. Setaria verticillata (L.) Beauv. 21, Middx.; rubbish tip, Northolt, B. Welch, confirmed by C. E. Hubbard, comm. D. H. Kent. Kent.

§758/3. Spartina Townsendii H. & J. Groves. *73, Kirkc.; coast near Orchardton Bay, 1947—local enquiry elicits the fact that no planting has taken place on this coast, but G. F. Scott Elliott is known to have planted it on the Solway coast where it soon disappeared, H. Milne-Redhead.

†763/2. Sorghum halepense (L.) Pers. 21, Middx.; rubbish tip, Northolt, B. Welch, det. C. E. Hubbard, comm. D. H. Kent.

§767/1. Hierochloe odorata (L.) Beauv. *H.39, Antrim; banks of Lough Neagh, 1946, E. N. Carrothers and R. D. Meikle—new to Ireland: see *Irish Nat. Journ.*, *10*, 377-380, 1946, for account of discovery and photo of plant *in situ*.

770/3. Alopecurus myosuroides Huds. 17, Surrey; waste ground, bombed site, Peckham, 1946, C. West.

†770/7. Alopecurus utriculatus (L.) Pers. 25, E. Suff.; Felixstowe Docks, 1939, J. E. Lousley and E. C. Wallace, det. C. E. Hubbard.

§777/2. Phleum alpinum L. *106, E. Ross; gullies on Mullach a Ghlas-thuill, Glen Cannich, with *Juncus castaneus*, E. C. Wallace: above west side of Loch Tuill Bhearnach, Glen Cannich, S. M. Walters and E. F. Warburg.

780/1. Agrostis semiverticillata (Forsk.) C. Chr. S, Guernsey; Câtel and St Peter Port, 1947, D. McClintock.

†780/9. Agrostis hiemalis (Walt.) B.S.P. 12, N. Hants.; drained bed of Fleet Pond, 1941, E. C. Wallace, det. C. E. Hubbard.

†782/3. Polypogon maritimus Willd. 30, Beds.; Great Drakelow Pond, Woburn Park, 1947, W. Watson and J. G. Dony, det. C. E. Hubbard.

§783/1. Calamagrostis epigeios (L.) Roth. *73, Kirkc.; Almorness Peninsula, 1947, H. Milne-Redhead.

789/1. Aira caryophyllea L. 21, Middx.; Mimms Hall Wood, South Mimms, D. H. Kent.

†822/3. Briza maxima L. S, Guernsey; Petit Bo Bay, 1947, D. McClintock.

824/2e. Poa pratensis L. var. latifolia Weihe. 21, Middx.; abundant along the canal bank at Hanwell, D. H. Kent, det. C. E. Hubbard.

825/3(2). Glyceria declinata Bréb. 49, Caern.; mainland opposite Bardsea Island, 1947, Miss B. M. C. Morgan.

825(2)/5. Puccinellia fasciculata (Torr.) Bickn. 18, S. Essex; near Stansgate Abbey, 1947, F. Rose.

826/3. Festuca arundinacea Schreb. 55, Leics.; many localities, about as common as *F. pratensis*, T. G. Tutin.

826/4×829/1. ×Festulolium loliaceum (Huds.) P. Fourn. 29, Cambs.; allotments, Ely, 1947, M. S. Campbell and N. Douglas Simpson.

826/7c. Festuca rubra L. var. dumetorum (L.) Lej. & Court. 21, Middx.; Harefield Moor, D. H. Kent, det. C. E. Hubbard.

827/19e. Bromus hordeaceus L. var. pseudo-racemosus (Wats.) Asch. & Graeb. 57, Derby; on soil dumped on Hognaston Winn, 1947—appears occasionally in the district, first noticed on a factory tip at Ashbourne, 1940, K. M. Hollick.

§827/19(2). Bromus lepidus Holmb. *55, Leics.; Borough Hill, E. Leics., 1946, T. G. Tutin.

844/3. Equisetum sylvaticum L. 18, S. Essex; still abundant on Galleywood Common, 1947—recorded by Gibson in *Fl. Essex*, 1862—F. Rose.

844/3b. Equisetum sylvaticum L. var. capillare Hoffm. 70, Cumb. (district 3); in the grounds at Blaithwaite House, near Wigton, Miss J. Parkin, comm. Carlisle Mus.

849/1. Blechnum Spicant (L.) Roth. 18, S. Essex; Woodham Walter Common (in a *Sphagnum* bog), 1947, F. Rose.

851/4. Asplenium obovatum Viv. 3, S. Devon; shady rocks near Whitchurch, 1945, C. West.

856/5. Dryopteris aemula (Ait.) Kuntze. 14, E. Sussex; abundant in a wood E. of Balcombe, 1947—a new locality—F. Rose and E. C. Wallace.

856/8. Dryopteris Thelypteris (L.) A. Gray. 18, S. Essex; still very abundant on Woodham Walter Common, 1947, F. Rose. *73, Kirkc.; marshland near Mainsridale, near Kirkbean, H. Milne-Redhead.

856/9. Dryopteris Phegopteris (L.) C. Chr. 108, W. Suth.; by rill on road from Durness Ferry to Cape Wrath, R. B. Abell.

856/10. Dryopteris Linnaeana C. Chr. 108, W. Suth.; limestone broken rock near River Dionard, R. B. Abell.

864/1. Osmunda regalis L. 15, E. Kent; swamp N. of Tenterden: woods near Ham Street (but possibly planted here), E. Scott, comm. F. Rose. 16, W. Kent; still on Keston Common (last record in middle of last century here): Holwood Park: Bedgebury Forest: —all 1947, F. Rose.

865/1. Botrychium Lunaria (L.) Sw. 6, N. Som.; field N. side, top of Cheddar Gorge, growing with *Ophioglossum vulgatum*, R. B. Abell.

870/1. Lycopodium alpinum L. 46, Card.; towards head of Ceulan Valley, R. B. Abell.

872-876. All specimens determined by G. O. Allen.

872/2. Nitella opaca Ag. 90, Forfar; Loch Brandy, Clova, 1926, G. Taylor—a very congested form, G. O. Allen.

872/5. Nitella translucens Ag. 69, N. Lancs.; Three Dubs Tarn, Claife Heights, near Hawkeshead: Westm.; Podnut Tarn, near Windermere: Gillhead Reservoir, near Windermere, J. W. G. Lund.

§873/2. Tolypella prolifera Leonh. *61, S.E. York; Pocklington Canal, Storthwaite, 1945, G. Taylor

873/3. Tolypella glomerata Leonh. 62, N.E. Yorks.; Woodend near Thornton-le-Street, 1947, C. M. Rob.

876/3. Chara vulgaris L. 9, Dorset; Charmouth, 1947, W. D. Lang, comm. W. N. Edwards—oospores only, forming the covering of caddis-cases, G. O. Allen.

876/3b. Chara vulgaris L. var. longibracteata Kütz. 62, N.E. York; Ashberry near Helmsby, 1947, C. M. Rob—a very condensed shallow water form, G. O. Allen.

876/3c. Chara vulgaris L. var. papillata Wallr. 21, Middx.; pool near Yeoveney Halt, Staines Moor, B. Welch and D. H. Kent. 62, N.E. Yorks.; Spittal Beck, brick pond: Castle Howard, Great Lake, 1946, G. Taylor.

876/3e. Chara vulgaris L. var. crassicaulis Kütz. 11, S. Hants.; Crockford Bridge, 1946, W. Frost, comm. C. M. Rob.

876/5. Chara hispida L. 62, N.E. York; Woodend near Thornton-le-Street, 1947, C. M. Rob.

876/7. Chara contraria Kütz. 23, Oxon.; sheep wash with clay bottom, Chadlington, Lady Roche.

876/11. Chara aculeolata Kütz. 63, S.W. Yorks.; correct entry on p. 778, *B.E.C. 1943-4 Rep.* (1946) to read 63, S.W. Yorks. from 63, N.E. Yorks.—E. C. Wallace.

§876/17. Chara delicatula Ag. *62, N.E. York; Grosmont, pond, 1946, E. R. Cross, comm. C. M. Rob.

PUBLICATIONS

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N.W. European Juncus alpinus forms. Lindquist (1930) ...	2	6
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PLANT NOTES

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ABSTRACTS

Offers of assistance will be appreciated. They may be made either to the Editor or to Mr A. H. G. Alston, British Museum (Natural History), Cromwell Road, London, S.W.7. For instructions, see B.E.C. 1946-47 Report, p. 347.

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REPRINTS FOR SALE (continued).

COLLECTED NOTES

Druce (1918).	Papaver Rhoeas, Centaurium scilloides, Ajuga genevensis, Cystopteris . . . Dickeana ...	1	0
—— (1923).	Silene Italica, Tillaea aquatica, Solidago cambrica	0	6
	Euphrasia septentrionalis, Orchis latifolia, Poa trivialis var. septentrionalis	0	6
—— (1925).	Rumex aristatus, Senecio erraticus	0	6
—— (1927).	Galium debile, New Taraxaca, Menthae	0	6
—— (1928).	New Alchemillae, New Hieracia, New Taraxaca	0	6

MISCELLANEOUS

Evolution and Classification of Flowering Plants.	Parkin (1928)	0	6
Bombed Sites, London.	Lousley (1941-2)	2	0
Bombed Sites, London.	Lousley (1943-4)	1	0

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E. F. WARBURG

M.A., Ph.D.

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THE AUSTRALIAN MYRIOPHYLLUM VERRUCOSUM LINDLEY IN BRITAIN

By J. P. M. Brenan and J. F. G. Chapple.

On 20th July 1946 the B.E.C. Excursion, under the leadership of Dr J. G. Dony, visited a large disused gravel-pit near Eaton Socon, Bedfordshire (v.-c. 30). The excavations from which the gravel had been taken had filled with water and were fairly deep. In one of these a mass of aquatic vegetation grew near the margin which, on examination, proved to consist largely of two species of *Myriophyllum*. One was quickly identified as *M. spicatum* L. in good fruiting condition; the other, mainly in flower and with immature fruits, proved puzzling, and brought forth many suggestions as to its identity; *M. verticillatum* L. var. *pectinatum* DC. being the commonest suggestion. Diligent search was made, without success, for ripe fruits.

On returning to Oxford, the material obtained was examined by one of us (Brenan), and could not be matched with any state of *M. verticillatum* to which, in the field, it appeared to be closest. Reference was then made to A. K. Schindler's (1905) treatment of *Haloragaceae* in *Das Pflanzenreich*, and the plant appeared to key down by this to either *M. verrucosum* Lindl. or *M. elatinoides* Gaudich. Comparison with specimens of *M. elatinoides* in the Fielding Herbarium, Oxford, ruled out the possibility of the Eaton Socon plant being this species, on account of the larger leaves and almost entire floral bracts of the former, but it did show striking similarities to a small piece of a plant with well-developed fruits labelled *M. verrucosum* Lindl. Our Eaton Socon material, with immature fruits, did not show the characteristic tubercles on the mericarps, and it was therefore decided to collect more and riper material at a later date.

Accordingly, the locality was visited again on 11th August in the company of Mr G. M. Ash and Dr J. G. Dony, but the plant in the original pool was found to show very few fruiting spikes. However, only a few yards away on the edge of the same pool, the plant was found in a dwarfed terrestrial state growing on wet gravel and producing an abundance of mature fruits which showed clearly the characteristic tubercles and the whitish line on the back of each mericarp. The plant was also found in a similar terrestrial state on the edge of another pool in the same gravel-pit, and in deep water in a third small pool.

Subsequently Dr J. G. Dony sent us some material of *Myriophyllum* from the Luton Museum Herbarium. Among this were two sheets labelled *M. verticillatum* L. from Eaton Socon, collected in 1944 and 1945, which are unquestionably *M. verrucosum*.

Through the kindness of Dr W. B. Turrill, Keeper of the Herbarium, Royal Botanic Gardens, Kew, a specimen of *M. verrucosum* Lindl. from the

Fig. 1, upper portion of submerged plant, habit, *half natural size*; 2, 3, 4, bracts from different positions on spike from below upwards, ×9; 5, bract and unopened flower, viewed from axial side, ×8; 6, single petal, ventral view, ×8; 7, single petal, side view, ×8; 8, flower, early stage, petals removed, showing stamens, calyx and bracteoles, ×8; 9, flower, late stage, stamens fallen, showing elongate stigmatic hairs, ×9; 10, fruit, ×7½; 11, fruit, diagram of transverse section; 12, terrestrial plant, habit, *half natural size.*

type collection ("Sub-Tropical New Holland," *Lt.-Col. Sir T. L. Mitchell*, 1846; Herb. Bentham) was obtained on loan. Comparison of the Eaton Socon plant with this left no doubt of their identity, and showed that *M. verrucosum* Lindl. had been found in Britain and for the first time in the Northern Hemisphere. A good many other Australian specimens of *M. verrucosum* were subsequently seen, including several representing an apparently terrestrial condition similar to that seen at Eaton Socon.

M. verrucosum was first published by J. Lindley in Mitchell (1848), from specimens collected by Lt.-Col. Sir T. L. Mitchell in Queensland. It was described as follows:—

> "Foliis submersis capillaceo-multifidis, emersis ternatim verticillatis ovatis pinnatifidis, floribus octandris, fructibus tuberculatis."

M. verrucosum has, apparently, only been figured once before, by Williamson (1928), fig. 5 on p. 327. As this figure is small, sketchy, and without dissections we feel that a further figure of *M. verrucosum* will be useful, and we are grateful to Mr J. S. Shaw for preparing the plate of the Eaton Socon plant reproduced here.

We have drawn up the following description entirely from British material, indicating, where necessary, the few discrepancies with Schindler's excellent description.

Myriophyllum verrucosum Lindl. An *aquatic herb*, submerged except for the inflorescences, or ± entirely emersed when growing on exposed mud or gravel close to water. *Stems* of the submerged plants caespitose at base (at least sometimes), moderately robust, up to about 50-60 cm. long in the British plants (up to 1 m. long, *teste* Schindler), about 1-2 mm. in diameter, often ± slightly swollen between the nodes, suberect, rooting at the lowermost nodes, branched from the base upwards and especially in the upper part, lateral branches arising singly or in pairs; stems often blackish and ± defoliated below, whitish-green above, terete or nearly so in section, glabrous, often with numerous, scattered, very minute, brown dots even on the younger parts (apparently due to disease); stems of the emersed plants short, up to 10 cm. long, decumbent (a few cm. high), slender, rooting freely from the lower nodes, profusely branched especially below, pale green or ± tinged with bright red-purple. *Leaves* on submerged plants in whorls of 3 (3-5 *teste* Schindler), crowded and longer than the internodes on the barren shoots, less crowded and shorter than internodes on flowering shoots and on lower parts of stem, up to c. 9 mm. long × 10-13 mm. wide (up to 4 cm. long, *teste* Schindler), deep green to olive, glabrous, sessile, rigid, ± upcurved, short, very broadly triangular in outline, smaller towards bases of shoots and somewhat so towards apices, pinnatipartite; rhachis linear, with about 4-9 linear-subulate, slightly forward-curved, acute segments arising alternately or opposite one another on each side of the rhachis, the lowermost segments up to 7.5 mm. long, the upper ones rapidly but regularly decreasing in length, the upper-

most about 1 mm. long; leaves on the emersed plants ternate to paired and opposite or even alternate, usually pale green or ± purple-tinged, and usually with a broader rhachis and shorter, broader, and often fewer segments. *Inflorescences* (of submerged plants) terminal, elongating, up to c. 18 cm. long (but usually shorter), nodes crowded towards apex, more spaced below; bracts normally ternate, occasionally opposite, 2-8 × 1.25-3 mm., broadly ovate to elliptic or obovate-elliptic, obtuse at apex, densely but microscopically papillose with projecting epidermal cells, the lower bracts pale glaucous-green, incise-serrate with the undivided portion ovate to oblong, the median and upper bracts pale glaucous-pink with green points to the teeth or a narrow green margin, ± serrate, the uppermost subentire; flowering nodes usually separated from the normal submerged sterile nodes by a few to several nodes bearing intermediate leaves with broader rhachides than the normal submerged leaves; emersed plants without any clear division into flowering and sterile parts, the flowers extending down to near the base of the plants. *Flowers* all apparently hermaphrodite, solitary in each bract axil, 1-3 per node, subsessile. *Bracteoles* 2, c. 0.75-1 mm. long × c. 0.3 mm. wide, whitish, narrowly ovate to oblong, ± serrate, subacute at apex. *Calyx* lobes 4, c. 0.3 mm. long, minute, whitish, oblong or ± triangular, ± serrate. *Petals* 4, entire, pinkish-green, 2.75 mm. × 1.4 mm., obovate, with a single central nerve almost reaching the rounded, hooded apex, papillose on back (like the bracts). *Stamens* 8; filaments filiform, c. 0.75 mm. long; anthers 1.3-2 mm. × c. 0.3-0.7 mm., yellow. Styles 4, c. 0.2-0.3 mm. long, ± bluntly conical, connivent, at first (when stamens are dehiscing) almost smooth, later (when stamens have withered) densely clothed with elongate hair-like stigmatic papillae towards apex. *Ovary* inferior, cup-shaped, 4-sulcate, sulci opposite the sepals, c. 0.5 mm. long and 1 mm. wide at apex. *Fruit* up to 1.5 mm. long and 1.75 mm. wide, with persistent bracteoles at base, broadly ovate-truncate, bluntly four-lobed at apex with the persistent styles; tetragonal in cross-section, ultimately separating into four one-seeded mericarps; mericarps prominently, bluntly and longitudinally ridged on back, ridge becoming acute, narrower and more evident when dry, and with a less prominent ridge along the commissure, minutely and bluntly tubercled on the outer faces, purplish-red on faces and cream to grey on ridges.

V.-c. 30, Beds.; gravel-pit, Eaton Socon, 30th August 1944, *J. G. Dony*; same locality, 3rd August 1945, *E. Milne-Redhead* and *J. G. Dony*, both in Herb. Luton Museum as *M. verticillatum* L.: large pools in gravel-pit near Eaton Socon, 20th July 1946, *J. P. M. Brenan* No. 7343, and *J. F. G. Chapple* No. 467205 (and others—B.E.C. Excursion); 11th August 1946, *J. P. M. Brenan* No. 7343A and *J. F. G. Chapple* No. 468119; specimens of both gatherings are in Herb. Oxford, and in Herb. Brenan.

M. verrucosum appears to be confined to Australia where, according to Schindler (1905) it occurs in all the states except Central Australia.

Black (1926) says that it is found throughout South Australia and extends to the far North. Ewart (1930) says that it is widely spread in North-east Victoria. Williamson (1928) gives a similar distribution for this state. Bailey (1900) for Queensland cites specimens from Mount Elliott, Balonne River at St George's Bridge, and Moreton Bay, but says that it is common.

Schindler (1905) divides the genus *Myriophyllum* into three subgenera. *M. verrucosum* comes under the subgenus *Eumyriophyllum* Schindler, characterised by hermaphrodite (or, by reduction, unisexual) flowers, 4 or 8 stamens with broadly linear, not elliptic, anthers, and a 4-partite fruit; the other two subgenera have unisexual flowers, 2 or 4 stamens with elliptic anthers not more than thrice as long as broad, the leaves never whorled and the fruit 2- to 4-partite. Under *Eumyriophyllum* there are two sections, *Pentapteris* DC. emend. O. Kuntze, and *Tessaronia* Schindler, characterised by having eight and four stamens respectively. *Pentapteris*, to which *M. verrucosum* belongs, is divided into four subsections, based principally on the arrangement of the leaves, and also on the shape, surface, and persistence of the mericarps. Of these our plant belongs to the subsection *Spondylophyllum* Torrey & Gray on account of its normally verticillate leaves and flowers, and on the prolonged coherence of its mericarps, which are neither cylindrical nor smooth. A further division is made into two series, of which *M. verrucosum* belongs to the second series *Anisophylleae* Schindler on account of the well-developed laminae of nearly all the bracts, and its position is further limited by the marked distinction between the bracts and the submerged leaves, also by the former being sessile with the lower ones pinnatifid.

The species most closely related to *M. verrucosum*, and with which it might easily be confused, is *M. elatinoides* Gaudich., which is widely distributed in the southern Hemisphere (except Africa), extending north to Mexico and Oregon (Fernald (1919)). The principal character distinguishing *M. elatinoides* is the smooth, rounded, not tubercular or ridged, back to each mericarp. In addition, the bracts are larger and mostly subentire, and the plant as a whole is more robust. Williamson (1928) says that *M. verrucosum* "resembles *M. elatinoides* in miniature, with finer submerged leaves." The leaves of all the material that we have seen of *M. verrucosum* are considerably shorter (up to 8 mm.) than those of *M. elatinoides* (10-15 mm.), although Schindler (1905) describes the leaves of the former as being up to 40 mm. long; no material, however, that we have seen of *M. verrucosum* even approaches this length. If Schindler's synonymy is correct, the name *M. elatinoides* Gaudich. must be replaced by the earlier *M. quitense* H.B.K.; 1823: *Nov. Gen. et Sp. Pl.*, *6*, 89, which was based on a sterile specimen from the district of Guancabamba (i.e., Huancabamba, which, although described as on the Quitonian Andes, is now in northern Peru: see Sandwith (1926)). It seems unwise to adopt this name until its identity has been confirmed, since the original description is so indefinite.

M. verrucosum is less closely related to any of the British species, but it may be useful to mention the main points of difference. The closest relative among these is *M. spicatum* L., which differs in the much larger submerged leaves (up to 35 mm. long), mostly in fours, in the entire bracts, which are shorter than the, normally hermaphrodite, flowers, and in the larger fruits, not ridged on the back of the mericarps. *M. verticillatum* L. differs from *M. verrucosum* very obviously in its simple or slightly branched stem, much more robust habit, with longer, 4-5-nate leaves, and in the bracts often being similar in size and cutting to the submerged leaves, or, if reduced, then with the rhachis at most narrowly triangular and not dilated into an ovate lamina; the fruits of *M. verticillatum* are subglobose, with the mericarps rounded on the back and not ridged. *M. alterniflorum* DC. is most distinct in the reduced inflorescence and unisexual flowers, with only the lower (female) verticillate, and the flowers equalling, or slightly exceeded by, the bracts. *M. alterniflorum* var. *americanum* Pugsl. somewhat resembles *M. verrucosum* in habit and size of submerged leaves, but in no other significant characters. The recently found alien, *M. heterophyllum* Michx., differs in its sparse branching; much longer, 4-6-nate leaves; very different bracts; flowers with only 4 stamens; and mericarps ± rounded on the back. Fuller descriptions of, and a key to the three native British species will be found in a paper by Pearsall (1934). Pearsall implies that the flowers of all the British species are normally unisexual. This certainly seems to be true of *M. spicatum* and *M. alterniflorum*, but we have seen some specimens of *M. verticillatum* with predominantly hermaphrodite flowers and others which seem almost entirely female.

The status of *M. verrucosum* at Eaton Socon is clearly closely bound up with that of the numerous other adventive species, more especially the various remarkable Australian rushes, that have been found there. It seems reasonable to suspect that at least all the Australian species found there have a common origin. Direct evidence on this is lacking, but a good deal of circumstantial evidence points to these plants, whose intentional introduction seems almost out of the question, having arrived in this country with Australian wool. It is known that woolshoddy has been, and is, extensively used in the neighbourhood by market-gardeners and farmers as a manure and water-retaining agent. A florula, seen growing from actual wool-shoddy at Flitwick station, Beds., duplicated several of the more unusual alien species seen at Eaton Socon (see the account of the B.E.C. Excursion to Bedford in *B.E.C. 1946-7 Report* (1948)). The vast majority of the alien species at Eaton Socon have been previously recorded as wool-aliens on Tweedside (Hayward and Druce; 1919), and, although many are native of the Mediterranean region, almost all these are recorded as common established aliens in Australia. Several of these are dealt with by Milthorpe (1943), who discusses their presence in New South Wales wool and their dispersal mechanisms, with illustrations; he makes no mention, however, of any

Myriophyllum. It seems perfectly feasible that mud containing the fruits of this plant, or even portions of the plant bearing fruits, should become attached to the fleece of sheep going to drink. It is significant, in this connection, that such a typical mud-plant as *Limosella* has been recorded as a wool-alien by the Tweed.

As will be seen from the specimens cited, *M. verrucosum* has been collected at Eaton Socon in three successive years and when we saw it it had every appearance of being well-established* in several places in this gravel-pit. It was in good quantity and fruiting well, and it seems quite likely that it may spread from here by natural means (birds, etc.) to other suitable water in the neighbourhood, and it should be looked out for. A considerable number of water-fowl frequent these pools, and may well be agents for its dispersal.

As yet little is known of the biology of this species. When first seen in July at Eaton Socon it was in flower and young fruit. Early in August it was still flowering but with a number of apparently mature fruits. The flowers appear to be markedly protandrous, the anthers dehiscing while the petals are still attached, or at least soon after they fall, and while the stigmas are still immature. Only later, after the petals have fallen and the stamens withered, do the stigmas apparently become receptive by developing the characteristic crown of hairs referred to in our description.

Plants from Eaton Socon have been cultivated by one of us (Chapple) and at the time of writing (January 1947) are still green and living, and show no signs of "dying back" although kept in an exposed tank where the temperature has at times fallen to 20° Fahrenheit or even lower.†

With the existence of Schindler's (1905) admirable monograph of the genus, it seems time that the species of *Myriophyllum* recorded from Britain were arranged in accordance with it, and we propose the following order to replace in the next edition of the *British Plant List* that of Druce (1928):—

216 MYRIOPHYLLUM L.

1. **verticillatum** L.
2. **spicatum** L.
3. *verrucosum* Lindl. Australia.
4. **alterniflorum** DC.
   b. **americanum** Pugsl.
5. *heterophyllum* Michx. N. Am.

*It should be noted that since this paper was written visits have been made to Eaton Socon in 1947 and 1948, and *M. verrucosum* was not seen on these occasions. The unusually severe winter of 1946-7 may have been too much for it.

†The history of these plants may now be completed. They appeared to live through the cold winter of 1946-7, but did not produce new shoots in 1947 and gradually decomposed. The plants produced fruits, which were found in the bottom of the tank, but they did not germinate in 1947 or 1948.

It will be noticed that *M. verticillatum* L. var. *pectinatum* is not mentioned. It appears to us to be no more than an inconstant state produced by terrestrial growth, or by changes in water-level during development. In a pond at Kennington, Berks., v.-c. 22, abundant *M. verticillatum* in deep water showed innumerable gradations between spikes with bracts similar to the submerged leaves and those of " var. *pectinatum*." Pearsall's (1934) contention that it is due to shallow-water conditions thus does not seem to be always the explanation. Those who retain var. *pectinatum* should note that its attribution to De Candolle is incorrect. The epithet first appears as a species, *M. pectinatum* DC.; 1815: *Fl. Fr., 6,* 529, with *Millefolium aquaticum pennatum spicatum* Magn. *Bot.* 178 as a synonym. It seems first to have been used in varietal rank by Wallroth; 1822: *Sched. Crit., 1,* 489; but he only cited the previous names of De Candolle and Magnol as doubtful synonyms of his var. *pectinatum*. It was left to Koch; 1843: *Syn. Fl. Germ., ed. 2, 1,* 270, to lump Wallroth's variety and De Candolle's species. The correct citation is, then, *M. verticillatum* L. var. *pectinatum* Wallr.

Bailey, F. M.; 1900: *The Queensland Flora, 2,* 558.
Black, J. M.; 1926: *Flora of South Australia,* 432.
Druce, G. C.; 1928: *British Plant List, Ed. 2,* 44.
Ewart, A. J.; 1930: *Flora of Victoria,* 887.
Fernald, M. L.; 1919: Two new Myriophyllums and a species new to the United States; *Rhodora, 21,* 120-124.
Hayward, I. M., and Druce, G. C.; 1919: *The Adventive Flora of Tweedside.*
Milthorpe, E. J.; 1943: *Vegetable Matter in the New South Wales Wool-Clip.*
Mitchell, T. L.; 1848: *Journal of an Expedition into the interior of tropical Australia . . .* , 384; London.
Pearsall, W. H.; 1934: The British Species of *Myriophyllum*: *B.E.C. 1933 Rep.,* 619-621.
Sandwith, N. Y.; 1926: Humboldt and Bonpland's Itinerary in Ecuador and Peru; *Kew Bull., 1926,* 186.
Schindler, A. K.; 1905: Halorrhagaceae: Engl. *Pflanzenreich 4,* (225).
Williamson, H. B.; 1928: *Victorian Naturalist, 44,* 325-7.

WEIHEAN SPECIES OF RUBUS IN BRITAIN

By W. C. R. Watson.

The first monograph of the Rubi to appear in Europe was a work by Weihe and Nees, entitled *Rubi Germanici*, which came out in fascicles in the period 1822-1827. It contained a detailed description in Latin and in German and a plate, partly coloured, of each species: 49 species were dealt with. Of these 18 were recorded as growing around Minden only, and four were given for Silesia only and two for Altena only. It might thus be supposed that one half of the species described were purely local plants. As a matter of fact, however, 23 out of the 24 have been found in England.

Many of the species of Weihe, and of Weihe and Nees, are well understood by British botanists. Those here dealt with are mostly of recent discovery in Britain, and are then marked with an asterisk, even when the name has been used before, in error for a British bramble; whilst some others, enclosed in brackets, are included for the purpose of pointing out that they do not occur in Britain, and should be rejected from the British list.

Some of these species are extremely rare in Britain, and, indeed, they are equally so on the Continent. Their presence in Britain, however, is for that reason especially significant for the proper understanding of the past history of British Rubi and Continental Rubi. The average botanist, with small knowledge, or none, of the commoner Rubi, would hardly detect these without assistance, and rather precise indications have therefore been furnished of their stations, together with descriptions in certain cases where this seems desirable to aid in their recognition. Regard should be had to the characters of the series and sections in which they are severally placed. These will be found described in Watson (1946).

**Rubus vulgaris* Weihe & Nees var. *α viridis* Weihe & Nees: 1825: *Rubi Germanici*, 38, 39. (Silvatici Calvescentes). See Watson (1931B, 423). 16, W. Kent; Dartford Heath, on the west side near the main road A2, in plenty (see *B.E.C. 1933 Rep.*, 754). 17, Surrey; Littleworth Com. and Ditton Marsh, abundant; Horsell Com. 22, Berks.; Yateley Com.

Rubus vulgaris* Weihe & Nees var. *ε mollis* Weihe & Nees; 1825: *Rubi Germanici*, 38, 40. (Silvatici Calvescentes). 15, E. Kent; Kings Wood, Sutton Valence. 17, Surrey; Putney Heath, east of Kingsmere, near a bush of *R. Radula* Weihe. (Can this be the "*R. leucandrus*" recorded for Putney Heath in Salmon (1931, 268), and said by Rogers to have been "untypical *R. gratus*"?). I have seen this bramble in the Belgian Ardennes. I regard it as a distinct species, **Rubus latiarcuatus

nom. nov. ("Caulis . . . late arcuatus . . ." Weihe and Nees). (SILVATICI Calvescentes). Robust. Stem red, angled, slightly hairy: prickles long, straight, many, often in two's or three's, occasionally a prickle. Leaves glabrescent above, bifariously pilose on the nerves and felted between them beneath; terminal leaflet roundish or obovate, cuneate below. Panicle broader below, upper branches usually 1-flowered; prickles many, unequal. Stipules, bracts, pedicels and calyx slightly glandular. Flowers pink. Sepals loosely reflexed.

The three other varieties of *R. rulgaris* Weihe & Nees are now regarded as species: var. *β umbrosus* is *R. pyramidalis* Kalt.; var. *γ glabratus* is *R. nemoralis* P. J. Muell.: and var. *δ rhombifolius* is *R. rhombifolius* Weihe. The var. *α viridis* may therefore now be called simply *R. rulgaris* Weihe & Nees emend. W. Wats.

**R. Libertianus* Weihe in Lej. & Court.: 1831: *Comp. Fl. Belg.*, 2, 163. (SILVATICI Macrophylli). This was first found in the neighbourhood of Verviers, Belgium, where Lejeune lived, and was described by Weihe. It has hitherto been thought to be confined to Belgium. In 1936 I found a single plant of it on a bushy slope between the Fox Inn and Boars Hill village, Berks (v.-c. 22). In 1946 Dr J. G. Dony and I found several bushes of it growing with *R. sulcatus* Vest. and *R. plicatus* W. & N. at Heath, Beds (v.-c. 30). Focke considered that *R. Libertianus* is related to *R. sulcatus*, perhaps a subspecies of it, although he did not actually include it in the SUBERECTI, to which *R. sulcatus* belongs. *R. sulcatus* grows within 600 yards of *R. Libertianus* at Boars Hill, and is recorded from the same locality—Waterloo—as *R. Libertianus* in Belgium. I am inclined to think that *R. Weihei* Lejeune, which also Lejeune found around Verviers, is the same as *R. Libertianus*. In a weak, shaded state *R. Libertianus* could almost be mistaken for *R. Brittonii* Bart. & Ridd. (Candicantes) or for *R. egregius* Focke (SILVATICI Nemorenses).

The following description is from the Heath plant.

Stem not suberect, green to reddish purple, glaucescent, somewhat sulcate, slightly pilose, occasionally aculeolate; prickles few below, rather many above, rather unequal, declining, rather hairy. Leaves quinate, petiole felted, prickles hooked, pricklets rare; leaflets all shortly stalked, imbricate, greyish green felted and pubescent beneath; terminal leaflet ovate acute and slightly lobate, or elliptical cuspidate, shallowly crenate, principal teeth patent, base subentire. Panicle compound, rather long and dense, with rather long, sharply ascending lower branches and half-erect, 1-2 flowered upper branches, which exceed the terminal flower, usually with 1-4 simple leaves; prickles few above, rather many below, slender and declining; pricklets rare; leaves finely serrulate. Sepals grey felted, often with broad long leafy tips. Petals obovate, pinkish white, fringed with hairs. Stamens white, long. Carpels glabrous. All the axes of the plant sprinkled with minute subsessile glands. Flowering from the first week in July into August.

**R. Schlechtendalii* Weihe in Boenningh.; 1824: *Prod. Fl. Monast.*, 152. (Silvatici Macrophylli; Weihe & Nees, *Rubi Germanici*, 134, t. 11; Boul. in Rouy, 1900, *Fl. Fr.*, *6*, 52; P. J. Mueller, *Versuch*, 108; G. Braun, Hb. Rub. Germ., no. 6, Löhne im Wesergebiet. Löhne is situated 2½ miles from Mennighüffen, in the vicinity of which was one of Weihe's stations for *R. Schlechtendalii*. Billot's no. 1469, coll. Questier, Aisne, is a specimen from the shade.

Dr J. G. Dony and I found a bush of this at Deadmansea Wood, Beds. (v.-c. 30), in 1946, and another at Heath, Beds., in 1947.

Robust. Stem bluntly angled, furrowed, exaculeolate, pruinose, violet on the exposed side. Leaves very large, ovate-elliptical, long-acuminate, rather regularly crenate-serrate, strigose above, grey or white silkily felted and pubescent beneath, shortly stalked; petiole and central petiolule geniculate at apex. Panicle long, lax, leafy often to the summit, branches widely spreading and panicled, rhachis hirsute; prickles short, slender, nearly straight. Flowers about 2.5 cm. Sepals prolonged into leafy linear tips, white felted, laxly pilose, aculeate, glandular-punctate and sometimes aculeolate, loosely reflexed. Petals pink. Stamens pink, equalling or hardly exceeding the pinkish styles. Anthers at first long-pilose. Carpels long-pilose. Plant covered with subsessile glands on all the axes, flowering late.

Focke states that *R. lophophilus* G. Braun is a dry soil state of *R. Schlechtendalii*. I consider it to be a different species altogether. It somewhat resembles a small form of *R. Schlechtendalii* var. *anglicus*, but differs in its subcylindrical stem, short, curved, broad prickles, roundish cuneate petals, etc.

I regard *R. Schlechtendalii* var. *anglicus* Sudre as a species distinct from *R. Schlechtendalii*. It has been erroneously identified as *R. Schlechtendalii* by British botanists, along with *R. amplificatus* Ed. Lees (sometimes) and *R. subinermoides* Druce (sometimes), e.g., the Claygate record in Salmon (1931, 270). A description follows.

R. albionis sp. nov. (Silvatici Pyramidales). (*Albion*, a Greek name for Britain). Stem striate with raised angles, yellowish and brownish-red, glabrescent, sometimes slightly aculeolate; prickles subulate, declining, often bent slightly upwards. Leaves glabrous above, green beneath and at first a good deal pilose on the veins; terminal leaflet obovate cuneate, base entire, apex ± truncate cuspidate, teeth unequal, acuminate, erect or partly patent. Panicle dense, rather narrow, subracemose and slightly narrowed upwards, not leafy; rhachis in its upper part unarmed, densely felted and hirsute, inconspicuously glandular; pedicels and rhachis below armed with acicular prickles. Flowers about 2.75 cm.; sepals ovate-lanceolate attenuate, reflexed. Petals deep pink, elliptical cuneate, entire. Stamens long, pink; anthers almost always pilose. Styles yellowish. Fruit subglobose.

Turio acutangulus striatus, glabrescens, ruber, interdum parce aculeolatus; aculei mediocres, subulati, declinati. Folia quinata, supra glabra, subtus primum adpresse pilosa; foliolum terminale obovatum

cuneatum, truncatum cuspidatum, argute inaequaliter inciso-serratum. Panicula parum composita, densa, angustata, pro magna parte efoliosa atque inermis, superne imprimis tomentosa hirsutaque necnon glandulosa. Flores rosei, magni; sepala attenuata, reflexa; petala elliptica cuneata; stamina longa roseola; antherae saepissime pilosae.

Type: ref. no. 18733 in Hb. Watson; v.-c. 22, Berks.; Boars Hill, behind the Post Office.

Distribution: v.-c.'s 3, 5, 8, 9, 13, 22, 23, 24, 36, 38, 40, 47, 110. H.20. Schleswig.

**R. macroacanthos* Weihe & Nees; 1825: *Rubi Germanici*, 44, t. 18. T. Braeucker, *292 Deutsche, vorzugsweise rheinische Rubus-Arten und Formen*, 10, 11, e. descr. "Eine sehr charakteristische Art." (Silvatici Subvirescentes). In 1928 I found a bush of this species on Mousehold Heath, near Norwich (v.-c. 27), and another bush near the crossroads at Sprowston, about one mile away. There is also a specimen of this species in the Wedgwood Herbarium at Marlborough College, collected by Mrs Wedgwood at Sprowston, July 1925. Compare Wedgwood Catalogue, no. 518, where it is recorded that it was determined by H. J. Riddelsdell as *R. Colemanni* Bab. Bloxam and Babington also have misunderstood the species, and Focke errs in suggesting its identity with *R. incarnatus* P. J. Muell. in *Rubi Europae*, 137.

R. argenteus Weihe & Nees; 1825: *Rubi Germanici*, 45, t. 19. (Silvatici Subdiscolores). This name is a later synonym of *R. rhombifolius* Weihe in Boenningh. (1824, 151), and should therefore not be used. Focke (1902, 480) records that he saw a bush of *R. argenteus* at Spa; I saw a bush which I recognised as the true *R. rhombifolius* at Spa in 1937, and on going into the matter afterwards I became convinced that Wirtgen and Mueller, and Sudre, were right in identifying Lejeune's authentic specimens of *R. rhombifolius* as *R. argenteus* and that I was also right in recognising them as *R. rhombifolius*: Weihe has described the same bramble under the two names. See Watson (1933). As I there pointed out, Sudre's (1908-13) "*R. rhombifolius*," like Rogers's, is *R. rhodanthus* W. Wats., and his "*R. argenteus*" is *R. rhombifolius* Weihe. The bramble which British botanists call "*R. argenteus*" is *R. cryptadenes* Sudre, and the one which they call "*R. subcarpinifolius*" is *R. rhombifolius* Weihe. Magnificent bushes of *R. rhombifolius* Weihe may be seen at Hollybush Corner on Ham Common, Surrey (v.-c. 17), in the first half of July.

Distribution of *R. rhombifolius* in Britain: v.-c.'s 13, 16, 17, 20, 21, 22, 23, 29, 30, 55, 68 or 81, 110.

[*R. rhamnifolius* Weihe & Nees; 1825: *Rubi Germanici*, 22. This species does not grow in Britain, nor in fact anywhere west of the Rhine. Rogers admits that the British plant so called agrees exactly with a French specimen named *R. cardiophyllus* Lef. & Muell. collected by Letendre, but objects (i) that Mueller "represents the leaf-toothing as coarser than we find it," and (ii) that "Genevier makes the stalk

of the terminal leaflet nearly ⅓ the length of the leaflet, instead of (as it is with us) very nearly ½, or rarely quite ½ its length." Riddelsdell repeats these objections, stating that Mueller describes the toothing as "very coarse nettlelike" and "nettleleaved or coarse and unequal." But all four of their quotations are incorrect. (i) Mueller's actual words are "Bezahnung fast nesselartig eingeschnitten gesägt," that is, "Toothing nearly nettlelike-incise-serrate," meaning that the serrations are separated by incisions nearly as sharply cut as in the nettle. Notice that there is not a word in Mueller corresponding to "very" or "coarse" or "unequal." Mueller abbreviates to "sägeartigen gezähnten . . ." (serrate dentate) in his summary of characters. (ii) Genevier's (1880, 248) exact words are "foliole terminale à pétiolule égalant la ½ de sa hauteur . . . les laterales à pétiolules égalant le ⅓ de leur hauteur." Need more be said?]

**R. macrophyllus* var. *velutinus* Weihe & Nees; 1825: *Rubi Germanici*, 35, 36. Now treated as a species, *R. hypomalacus* Focke (1877). (Vestiti Virescentes). I have gathered this in a ditch in the lane below West Lavington Church, W. Sussex (v.-c. 13); in Cogg's Wood, Oxon. (v.-c. 23); and, with Mr N. D. Simpson, in Germany at Aachen "am Linzenshäuschen." At the last station the plant was more strongly aciculate and glandular than in the other stations, illustrating the variability to which Focke calls attention in this species in the appearance of stalked glands on the pedicels. *R. hypomalacus* has been placed, no doubt from this cause, in many different groups—(i) Suberecti-Subvestiti, (ii) Sprengeliani, (iii) Silvatici, (iv) Vestiti, (v) Adenophori-Subplicati, and (vi) Adenophori-Subcorylifolii. E. H. L. Krause's observations under *R. hypomalacus* Focke and *R. Hansenii* E. H. L. Krause may be consulted in Prahl (1890, 60).

**R. silesiacus* Weihe in Wimm. & Grab.; 1829: *Fl. Sil.*, *1*, (2), 53. (Vestiti Virescentes). This exceedingly rare species was found by Mr C. Avery and myself some ten years ago in Shrewsbury Park, Shooters Hill, W. Kent.

Stem arcuate-prostrate, climbing, scantily pubescent, glandular and aculeolate; prickles moderate; leaves quinate rather large, green and rather softly hairy beneath, terminal leaflet oblong-ovate, long-acuminate-cuspidate, base subcordate, margin rather doubly, unequally serrate, basal leaflets rather long stalked, petiole nearly glabrous, but glandular and aculeolate. Panicle felted and subpubescent, long, narrowed to apex, intricate, the branches deeply divided, conspicuously but not densely glandular and aciculate, prickles rather many, weak, declining and falcate. Calyx aculeolate and glandular, greyish white felted, reflexed. Petals rather narrow elliptical, white. Stamens white, about equalling the greenish styles. Carpels glabrous.

**R. foliosus* Weihe in Bluff & Fingerh.; 1825: *Comp. Fl. Germ.*, *1*, 682. (Apiculati Foliosi). Locally rather plentiful in Middlesex (v.-c. 21)

occurring here and there also in v.-c.'s 16, 17, 20, 30. I have seen it abroad at Eupen. It is not represented in the *Set of British Rubi*, and British botanists when they use the name seem always to mean *R. flexuosus* Muell. & Lef., which Rogers gives as a synonym of *R. foliosus*.

R. fuscus Weihe in Bluff & Fingerh.; 1825: *Comp. Fl. Germ., 1*, 682. (Apiculati Foliosi). The true species is not common in Britain. I sent it to the B.E.C. Distributor in 1945 from The Chart (near the pit), Limpsfield, Surrey (v.-c. 17). The bramble of the west of England which has been identified as true *R. fuscus* by British botanists, allegedly on Focke's authority, is **R. fusciformis* Sud. (Apiculati Pallidi), which has a broader, roundish ovate, long-pointed leaflet, and clasping fruit-sepals. Focke (1890, 133) says he collected (i) *R. fuscus* W. & N. at Milton and near Sway, S. Hants., and (ii) a variety with broader leaflets and sepals embracing the fruit in Leigh Woods near Bristol; and further he says that, besides (ii), he had received from England specimens resembling *R. fuscus* but more or less anomalous. Only (i), therefore, was, according to Focke, true *R. fuscus*; and this, as a matter of fact, was later described by Rogers as *R. fuscus* var. *nutans*: it equals *R. insectifolius* Lef. & Muell., completely. Thus Focke did not see, and did not know of, the true *R. fuscus* Weihe in England at all. White, in (1912, 282), and Townsend (1904, 136) do not quote Focke correctly.

**R. Menkei* Weihe in Bluff & Fingerh.; 1825: *Comp. Fl. Germ., 1*. 679. (Apiculati Foliosi). Mr C. Avery and I found this species in 1937 growing in company with *R. Balfourianus* Blox. in the hedge of a wet pasture west of Heathfield Park, E. Sussex (v.-c. 14).

**R. thyrsiflorus* Weihe in Bluff & Fingerh.; 1825: *Comp. Fl., Germ., 1*, 684. (Apiculati Scabri). There is a colony of this uncommon species in Kings Wood, Sutton Valence, E. Kent (v.-c. 15) by the roadside just 1000 yards north of East Sutton Church. It may also be studied conveniently in Angling Spring Wood, beside the footpath through the wood, west of Great Missenden Station (Bucks., v.-c. 24). It is gone from Tunbridge Wells Common. The Putney Heath and Wimbledon Common bramble which I recorded as *R. thyrsiflorus* in *J.B.* (1937, 201), is not that species, but a shade state of *R. fuscus*.

R. apiculatus Weihe in Bluff & Fingerh.; 1825: *Comp. Fl. Germ., 1*, 680. (Apiculati Incompositi). Like Focke, Sudre, and Gelert (who identified a wild Holstein bramble with his *R. anglosaxonicus* from the south of England) I regard *R. anglosaxonicus* Gel. as a synonym of *R. apiculatus* Weihe. Rogers and Linton (1905, 203) suggest that certain slight differences might be found between *R. apiculatus* and *R. anglosaxonicus* if they were compared, not knowing, apparently, that they had been already compared by Focke (1902, 580), and found to be identical. Riddelsdell changed the name from *R. anglosaxonicus* to *R. apiculatus*

in *London Catalogue*, ed. 11 (1925), being quoted in the preface as writing, " it is better to wait for certainty than to have to retract " ; but in Salmon (1931) and Wolley-Dod (1937) the name is changed back to *R. anglosaxonicus*. Neither in Britain nor on the Continent does a bush of *R. apiculatus* produce solely roundish stems throughout, or solely long, narrow, oval, terminal leaflets with nearly parallel sides. A bush which I saw near Malmédy (Belgium) in 1937 had an angled stem and oblong-obovate terminal leaflets, and seemed to me to be identical with the British and Irish plant; in fact, if a small piece of one bush were compared with a small piece of another in a different situation it would be easy to find greater differences on two British plants of *R. apiculatus*. Much would depend on the particular level on the stem at which the leaf specimen was taken, on the degree of exposure to the light in which the leaf had developed, on the moisture in the soil, the temperature, the date collected, whether the bush had been subject to mutilation in a hedge, and so on (Weihe and Nees' description was written to define a single bush growing in a hedge). The vigorous *R. apiculatus* (affected with a " pilosism ") that grows near the Beverley Brook on Wimbledon Common, Surrey (v.-c. 17), has not altogether the same leaves and flowers as the weaker *R. apiculatus* that grows abundantly in the wood at Bookham Common, Surrey, or as that growing in the very dark wood, closely coppiced, near Ryarsh Church, W. Kent (v.-c. 16). A specimen selected in July looks different from one taken in late August from the same bush.

**R. Reichenbachii* Koehl. ex Weihe in Bluff & Fingerh. ; 1825 : *Comp. Fl. Germ.*, *1*, 685. (Apiculati Incompositi). This is an extremely rare bramble originally found by Koehler near Schmiedeberg in Silesia, and regarded by Focke as so rare as to deserve notice only by reason of its historic interest. It was, however, he relates, refound in Silesia in 1869. I found a small group of bushes of this species, first about 20 years ago, fully exposed to the sun, by the entrance gate to Windmill Farm in Benhall Mill Lane near Tunbridge Wells, E. Sussex (v.-c. 14). There is, in Herb. Kew, a specimen from the same locality collected by Dr Gilbert of Tunbridge Wells in 1909, as *R. Colemani*.

Stem procumbent, subterete, glabrous or glabrescent, blackish purple, glaucescent; stalked glands and acicles scattered, or absent on some internodes; prickles moderate, irregularly distributed, unequal, declining or falcate. Leaves large, quinate, digitate, glabrous above, very finely pubescent beneath, coarsely, unequally, deeply and sharply serrate, undulate, the principal teeth somewhat patent, mucros blackish; terminal leaflet roundish ovate or slightly obovate, emarginate; intermediate and basal leaflets obovate cuneate; all leaflets long pointed; petiole rather short, prickles falcate and hooked; basal petiolules about 1 cm. long; petiole and petiolules black at their insertion and apex. Panicle almost equal, dense at the apex and furnished there with several narrow grey felted leafy bracts; all branches sharply

ascending, densely corymbose; rhachis glabrous to felted or slightly pubescent at the apex, acicular prickles, acicles and stalked glands many and unequal, as also on the peduncles, pedicels and calyces. Flowers large. Sepals linear-pointed, loosely erect. Petals white, broad, ovate-rhomboid, glabrous above and on the margin. Stamens white, long. Styles greenish. Carpels strongly pilose. Fruit ovoid, abundant.

The petioles of the flowering branch leaves are very short; the panicle branches which they subtend are often in pairs, the longer branch of the pair exceeding the petiole but falling short of the leaf. The bush has somewhat the aspect of **R. melanoxylon* Muell. & Wirtgen (frequent around Tunbridge Wells, W. Kent; and in Bucks., N. Essex, and Berks.), to which Focke considers it to be related. His description, as well as those of Weihe and Nees (1825, 87, t. 37), and Reichenbach (1830-2, 606), and Otto Kuntze's (1867, 94), remarks, are all based on material collected by Koehler at the foot of the Sudetens.

**R. Lejeunei* Weihe in Bluff & Fingerh.; 1825: *Comp. Fl. Germ., 1.* 683. (Grandifolii). In 1937 Mr N. D. Simpson and I collected this at Malmédy, Belgium, the *locus classicus* for the species. It grew in the hedge of the lane leading up La Montagne from Malmédy, one bush, against the fourth station of the Calvary. I collected it again at Spa, and also *R. fundipartitus* Foerster (=*R. Lejeunei* Wirtgen), which had roundish, deep pink petals and deep pink stamens, and is I think almost certainly the plant of Lejeune (1811, 233), *R. fruticosus*, which Weihe and Nees quote as a synonym of *R. Lejeunei*. See Watson (1935, 253). I have found *R. Lejeunei* in Ashenbank Wood, Cobham, and against the Mausoleum in Cobham Park, W. Kent (v.-c. 16).

R. Lejeunei of Rogers's (1900, 70) becomes *R. breconensis* W. Wats. (1946, 341).

R. Lejeunei var. *ericetorum* of Rogers (1900, 71), if taken as a species, as I think it should be, is *R. Moylei* Bart. & Ridd.

R. rosaceus Weihe in Bluff & Fingerh.; 1825: *Comp. Fl. Germ., 1.* 685. (Grandifolii). This species has been widely misunderstood, on the Continent as well as in this country. Rogers in his Handbook describes the west of England *R. scabripes* Genev. as the type—according to him—of *R. rosaceus* Weihe. (*Set*, No. 21, " . . . The type as yet with certainty only in Warwickshire and a few S.W. counties "). Focke describes the German-Belgian *R. aculeatissimus* Kalt.; 1845: *Fl. Aachen*, 300, in the belief that it is Weihe's plant. Sudre follows Focke's example. I have seen both *R. rosaceus* and *R. aculeatissimus* in some plenty in the Belgian Ardennes; and at Polleur, near Verviers—they were growing together beside a culvert over a stream east of the road (and tramway) to Verviers. *R. rosaceus* Weihe is well represented on two plates no. 122, with a description in *B.E.C. 1928 Rep.*, 862-3. *R. aculeatissimus* has not been found in Britain, but *R. rosaceus* is rather frequent in W. Sussex (v.-c. 13), W. Kent (16), Surrey (17),

S. Essex (18), and Middlesex (21). *R. rosaceus* is called *R. serpens* var. *calliphylloides* (Sudre) Sudre by Sudre (1908-13, 220), and "*R. viridis*" by some British botanists (*Set*, No. 23, Witley, Surrey). *R. rosaceus* of Genevier is **R. adornatiformis* Sudre (Obscuri), a frequent bramble on the Lower Greensand, south-east of Westerham, W. Kent (v.-c. 16).

R. Koehleri Weihe in Bluff & Fingerh.; 1825: *Comp. Fl. Germ.*, *1*, 68. I have found this in the wood south of the cricket ground at Waterham, W. Kent (v.-c. 16). The British species most often mistaken for *R. Koehleri* is *R. spinulifer* Muell. & Lef. (Hystrices), see Watson (1931, 426), and (1932, 767). The supposed "*R. Koehleri*" of Epping Forest, referred to in the former, 427, was *R. pygmaeopsis* Focke.

R. infestus Weihe in Boenningh.; 1824: *Prod. Fl. Monast.*, 153. (Hystrices). British, as well as most Continental, authors have applied this name to a bramble which is not Weihe's plant, and is far less prickly and less highly glandular, with greyish felted leaves and pink flowers, called *R. spurius* L. M. Neuman (Apiculati Incompositi). Rogers's (1900, 59) description applies to *R. spurius*, not to *R. infestus*. For the latter see Watson (1931A, 71).

**R. pygmaeus* Weihe in Bluff & Fingerh.; 1825: *Comp. Fl. Germ.*, *1*, 687. (Hystrices). I first collected this on 21.7.1938 in E. Sussex (v.-c. 14) near Tunbridge Wells, in the hedge beside the footpath leading from Forest Road, Warwick Park, to the Cemetery, at the point opposite a cottage where the hedge makes a right-angled bend to the west. I collected it again on 19.7.1940 at the same spot. I know no other station for it. This is another of Koehler's Silesian species found by him around Schmiedeberg.

It is a small bramble, obviously a *Hystrican*, the peduncles bearing long-stalked glands and long acicles, as well as prickles and felt and a slight amount of hair. Leaves ternate only, on my plant, both in 1938 and 1940. Terminal leaflet obovate cuneate long-acuminate, base subentire, margin very unequally, shallowly, sharply serrate-dentate, the principal teeth large, angular and patent. Panicle well developed, pyramidal, with long-peduncled branches and several simple leaves; prickles very long, declining. Sepals aculeate, long-pointed, erect. Petals rather narrow, elliptical, white. Stamens white, longer than the reddish-based styles. Carpels pilose.

**R. humifusus* Weihe in Bluff & Fingerh.; 1825: *Comp. Fl. Germ.*, *1*, 685. (Hystrices). This grows on Shooters Hill, W. Kent (v.-c. 16) in Jacks Wood, and also at the highest point of Eltham Common, near by that station. I have collected it also in Benhall Mill Lane, near Tunbridge Wells, E. Sussex (v.-c. 14).

Rogers and E. F. Linton (1905, 204) surmise that *R. humifusus* must greatly resemble *R. acutifrons* A. Ley, judging by a German specimen

and Weihe and Nees' (1825-27) description and figure. With a knowledge of both brambles, growing, I do not see any such resemblance.

R. humifusus is a low, slender and elegant plant, felted and pubescent, rather than pilose, with small white flowers, petals rather narrow, elliptical, notched, anthers sometimes pilose, sepals erect on the young fruit. The terminal leaflet is small, ovate cordate acuminate, the point being particularly long and slender. The stalks of all the leaflets are long on all the plants I have seen. The stem is not terete, but angled, obtusely below, acutely above, and bears many prickles and long acicles. The plant slightly recalls *R. euryanthemus* W. Wats.

R. acutifrons has few prickles, many but quite short acicles, a long panicle with nearly all the stalked glands shorter than the hair, and has larger, pink flowers and long stamens. It is a more robust and hairy plant. I have not met with it in S.E. England.

**R. Schleicheri* Weihe in Tratt.; 1823: *Rosac. Mon., 3*, 22. (Glandulosi Feroces). In 1937 I saw growing plants of this species at Burtscheid, Aachen, Germany, and at Spa, Belgium. It has until now not been recorded, I believe, in its typical form for Belgian territory —see Sudre (1910, 220). In 1938 I found a bush of this species exactly agreeing with the Continental plant, as described by Weihe and Nees. It grew in King's Wood, Sutton Valence, E. Kent (v.-c. 15). The following description relates to the typical plant (there are many varieties on the Continent).

Stem arching procumbent, rather weak, obtuse angled, pilose, slightly pruinose; prickles many, yellowish, strong based, unequal, the larger ones hooked; stalked glands crowded, yellowish, unequal. Leaves rather small, 3- (4, 5)-nate; terminal leaflets ovate-subrhomboid, tapering, sharply, unequally serrate, strigose and subglaucescent to shining above, densely, softly hairy beneath, with midribs glandular. Panicle narrow and leafless and subracemose above, nodding in bud, the peduncles and pedicels bearing crowded yellowish acicular prickles; rhachis flexuose, densely pilose and felted, stalked glands mostly shorter than the hair, some prickles hooked. Calyx felted, aciculate and glandular. Sepals long-tipped, patent to ± erect. Petals glabrous, white, rather broad, elliptical-obovate, contracted gradually to the base, some notched at apex. Stamens long. Young carpels pubescent. Fruit oblong.

The panicle is drawn erect in Weihe & Nees, t. 23, by an acknowledged artist's error.

R. Schleicheri Ed. Lees in Steele (1847) related to a bramble found around Great Malvern, of which the name was changed by Lees to *R. tenuiarmatus* in 1852: *Bot. Malvern.* His descriptions being overlooked, the same bramble was described afresh by A. Ley (1902, 70) as *R. dumetorum* var. *triangularis.* Babington (1869, 255, 257) wrongly identifies the bramble with *R. Balfourianus.*

R. Schleicheri Leighton (1840), based on a specimen no. 4 so named for him by Nees, and now in Hb. Babington, is *R. myriacanthus* Focke.

[*R. serpens* Weihe in Lej. & Court.; 1825: *Comp. Fl. Belg.*, *2*, 172. (Glandulosi Imbelles). Mr N. D. Simpson and I gathered the true *R. serpens* in 1937 on La Montagne above Malmédy, and on the way thence to Francorchamps. Focke also found it at Malmédy, and described it in (1877) *Syn. Rub. Germ.* Mlle. Libert, who lived at Malmédy, identified it as *R. Bellardii* according to a specimen from Malmédy, the name *R. serpens* Weihe being subsequently added. There are several other Belgian specimens agreeing exactly with it, according to Sudre, and agreeing with Weihe's description in Lejeune and Courtois. It seems to me that there need be no dubiety as to what *R. serpens* Weihe is. Sudre, however, although knowing this, in *Rubi Europae*, 210, makes this bramble a variety *aglabratus* Sudre of *R. rivularis* Muell. & Wirtgen, a much later species than *R. serpens*, using *R. serpens* to denote a different group of brambles. He defines the two groups as follows:

Pedicels and sepals armed with crowded acicular prickles and long glands ..... *R. rivularis* M. & W.
Pedicels and sepals glandulose but not armed or not very aciculate ..... *R. serpens* Weihe.

Sudre says that there are other specimens identified by Lejeune (not by Weihe) as *R. serpens* Weihe, viz., (i) near *R. tereticaulis* var. *pseudo-Bellardii* Sudre; (ii) a Luxembourg specimen correctly named *R. serpens* Weihe; and (iii) a Luxembourg specimen gathered by Lejeune, which according to Sudre is *R. hirtus* var. *guestphalicus* Sudre. It is not clear why Sudre goes on to say that it is therefore certain that Weihe (surely he should say Lejeune) confused three distinct forms under this name.

The description under *R. serpens* in Rogers (1900) seems to me to be written to cover (i) *R. angustifrons* Sudre, to which *Set* No. 74, collected by Rogers, refers; and (ii) *R. hylonomus* Muell. & Lef. It does not relate to *R. serpens* Weihe, for the occurrence of which in Britain I have seen no evidence.]

**R. hirtus* Waldst & Kit.; 1805: *Pl. rar. Hung.*, *2*, 150. (Glandulosi Imbelles). Although this species was not published first by Weihe and Nees it is dealt with in their Monograph. Rogers stated that he was not acquainted with it and could not confirm any record of its occurrence in Britain. Riddelsdell denied that it grows in Britain. I therefore sent British specimens to the B.E.C. Distributor in 1945. It will be found abundantly on Horsendon Hill near Sudbury, Middx. (v.-c. 21). I have also seen it in 15, E. Kent (King's Wood, Sutton Valence); 16, W. Kent (Pembury Walks); 17, Surrey (Coopers Hill, Hinchley Wood); 19, N. Essex (several woods about Quendon, Ugley and Widdington).

**R. Guentheri* Weihe in Bluff & Fingerh.; 1825: *Comp. Fl. Germ., 1*, 679. (GLANDULOSI Imbelles). Exclude the *R. Guentheri* of previous British authors and botanists, which is *R. flexuosus* M. & L. I have known a bush of Weihe's species for many years near Tunbridge Wells, west of the tunnel mouth south of Forest Road, Warwick Park, just inside E. Sussex (v.-c. 14). The chief distinguishing characters are as follows:

Stalked glands very dark red. Stems only slightly hairy, prickles moderately broad based, declining to recurved. Leaves deep green nearly glabrous above, and only slightly hairy beneath, mostly 3- and 4-nate, unequally, rather coarsely serrate; terminal leaflet elliptical-ovate acuminate, base subcordate. Whole panicle and calyces greyish felted, sepals for a time reflexed, not concave, afterwards ascending. Petals white, notched. Stamens shorter than the red styles.

This also is a bramble which Koehler found at Schmiedeberg in Silesia, but it extends westwards to Switzerland, the Jura, and the Auvergne to the Pyrenees.

Other species mentioned above as growing in Kent or E. Sussex, which were also found by Koehler at or near Schmiedeberg, are *R. silesiacus*, *R. pygmaeus*, *R. hirtus*, *R. Schleicheri* and *R. Reichenbachii*.

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ANOTHER BRITISH RHINANTHUS WITH PUBESCENT CALYX

By A. J. Wilmott.

During the recent excursion to Glens Affric and Cannich, a slender *Rhinanthus* collected by Miss Vachell near Loch Mullardoch, Easterness (v.-c. 96), quite low down, which had the habit and narrow leaves of the *Rhinanthus* common near Affric Lodge—somewhat intermediate between *R. stenophyllus* (Schur) Druce and *R. spadiceus* Wilmott (see *B.E.C. 1939/40 Rep.*, 361-379), proved to have the surface of the calyx hairy all over. It does not agree entirely with either the Clova *R. Lintoni* Wilmott or the Ben Nevis *R. lochabrensis* Wilmott, and, therefore, although its relationships are at present somewhat obscure, it must be given a new name.

Like *R. Lintoni*, it has the lower internodes short, but what branches there are are weak; but they occur in the lower part of the region of much elongated internodes. The lowest leaves—6-8 pairs in the lowest 20-25 mm. of stem—have fallen in the three specimens available for description. The weak branches are short and only show the initial stage of bud development. The leaves in mid-stem and below are arrect (i.e., perpendicular to the stem) or spreading; the intercalary leaves (one pair) ascending; the lowest bracts wide spreading, the remainder somewhat more spreading than in *R. Lintoni*. The stem leaves are very narrow (only 1-2 mm. broad) except for the slightly broadened base with more spreading and longer teeth. The leaves are finely pubescent above and below, but lack the longer pubescence on the midrib beneath which is found in *R. Lintoni*. The leaf teeth are appressed, the terminal one acute or bluntish, but not rounded as in *R. Lintoni*. The inflorescence is lax and few-flowered. The lowest bracts are like the leaves, the upper with broader sharp- and spreading-toothed base, the lowest teeth longer, narrower and acute or aristate: the distal part of the bract is narrow like the leaves, and much exceeds the flowers. The calyx is at first considerably longer than broad, with triangular teeth as long as or longer than broad, narrower than in *R. Lintoni*: it is finely appressed-pubescent all over. The corolla is slightly smaller than in *R. Lintoni* (and quite different from the large and peculiar-shaped corolla of *R. lochabrensis*), and is much more pubescent; the corolla tooth is prominent, violet, almost as long as broad (if the tapering part is excluded). The capsule is not yet developed, but it will probably be small, as in *R. spadiceus*.

Indeed, the plant looks extremely like some of the plants collected near Affric Lodge, which had glabrous calyces. Whether or not it may be conspecific with these, and the hairy calyx may be a variable character in some species of *Rhinanthus*, or whether it is really a dis-

tinct species, must await further material. Meanwhile, however, it needs a name, and is named after its observer as:—

Rhinanthus Vachellae mihi; *R. Lintoni* similis sed habitu (inter *R. spadiceum* et *R. stenophyllum* intermedio), foliis angustioribus, minus pubescentibus, internodiis superioribus elongatis, corolla magis pubescente cum dente prominente, aliis notis differt. Holotypus in *Herb. Mus. Brit.*

ANOTHER HYBRID CAREX FROM IRELAND*

By E. Nelmes.

Among *Carices* collected in Ireland by Mr A. W. Stelfox in 1946, and presented to Kew, is one which appears to be a hybrid between *C. riparia* Curt. and *C. vesicaria* L. This is the first time, so far as I know, that a hybrid between these species has been recorded from Ireland, but Druce collected what he considered to be *C. riparia* × *vesicaria* near Grendon Underwood, Bucks., in June 1911, and it was recorded in *B.E.C. 1911 Rep.*, 133 (1912), as "new to Britain." Subsequently Druce reported the hybrid from Ambrosden, Oxon., June 1915; near Wytham, Berks., July 1916; and North Stoke, Essex, July 1918; in *B.E.C. Rep.* for *1915*, 216 (1916); *1916*, 591 (1917); and *1918*, 405 (1919); respectively.

I have recently examined these specimens, as represented in Druce's herbarium, and they all seem to me to be referable to *C. riparia* itself, the Bucks. plant agreeing with Kükenthal's var. *subgracilescens*, and the others being nearer to the typical form of the species. The Irish record of the hybrid may therefore prove to be the first authentic one for the British Isles. *C. vesicaria* has been recorded from the marsh where this hybrid was collected, and Mr Stelfox says that *C. riparia* is also there, in considerable quantity.

Kükenthal's (1909: Engl. *Pflanzenreich*, *4*, (*20*), 759) short description of European specimens of this hybrid (he cites gatherings from Sweden, Germany, and Rumania under *Carex riparia* × *vesicaria* Simonkai [1886: *Enum. Fl. Transsilv.*, 556—*C. csomadensis* Simonkai, *l.c.*]), agrees partly with that of the Irish plant, but he says of the female scales "cuspidato-aristatae," and he gives the male spikes as 2-4 and the female ones as 2-5, which suggests plants nearer to *C. riparia* Curt.

Carex riparia Curt. × vesicaria L.

Plant loosely tufted. *Rhizome* extensively creeping. *Stems* 30-70 cm. tall, erect, 1.25-1.5 mm. thick, triquetrous, angles slightly scabrid above, otherwise smooth, ribbed. *Leaves* confined to about the lower third of the stem, most shorter than, but some about reaching, the apex of the terminal spike, 3-6 mm. wide, flattish, glaucous-green (at least when dried), conspicuously septate-nodulose below, less so above, strongly multinerved, midrib keeled on the under-surface and canaliculate-impressed on the upper surface, smooth below, scabrid on the margins and keeled midrib above; sheaths of the lower leaves reddish or vinaceous, the membranous front splitting up into herring-bone shaped fibres. *Spikes* 4-6, upper 3-4 male, dense-flowered, conico-cylindric, 1.5-4 cm. long, 1.5-3 mm. thick below, erect, bases subapproxi-

*See *B.E.C. 1945 Rep.*, 93, (1947).

mate, spikes half overlapping one another, sessile; remaining 2 (rarely 1) spikes female, uppermost sometimes with a male apex about 0.8-1 cm. long, dense-flowered except that the lower one is often lax- or sub-lax-flowered at the base, cylindric, 3.5-5.5 cm. long, 9-11 mm. thick (including spreading utricles) when fully developed, borne at nodes 8-10.5 cm. from each other, the upper one 6.5-9 cm. from the lowest male spike, the lower borne on a peduncle 4.5-8.5 cm. long, carried up to overlap the other which is subsessile to shortly (up to 1.5 cm.) peduncled, both erect or suberect, or lower perhaps somewhat nodding; peduncles smooth, obtusely trigonous. *Bract* of the lowest male spike subfoliaceous, shorter to longer than its spike; bracts of the remaining male spikes squamiform with long awns; bracts of the female spikes foliaceous but much smaller than the leaves and the upper smaller than the lower, about reaching up to the apex of the terminal male spike, the lower usually a little overtopping it, not or extremely shortly sheathing but with a brown, narrowly whitish-margined, membranaceous mouth in front. *Female scales* mostly about 4 mm., but some up to 4.5 mm. long, mostly about 1.75 mm. wide, ovate-lanceolate or oblong-ovate-lanceolate, obtuse at the apex, flattish to cymbiform, castaneous to spadiceous, margins rather widely but irregularly whitish-hyaline, uneven, tending to become erose, and often somewhat involute, midrib pale, often extending to the apex of the scale, sometimes shortly excurrent. *Utricles* 4.5-5 mm. long, 1.75-2 mm. broad, ovoid-conic or ovoid-lanceolate, inflated but shrunken, strongly multinerved, glabrous, yellow-green with reddish-brown patches, subcoriaceous, straight or straightish, obliquely spreading, not or extremely shortly and stoutly stipitate at the base, gradually tapering above and, at the apex, slightly narrowing into a compressed-cylindric, glabrous and smooth, not or scarcely marginate, 1 mm. long, bidentate beak, which is greenish with vinaceous or reddish stripes from the mouth downwards on each (dorsal and ventral) side; mouth straight; teeth diverging, reddish, about 0.4 mm. long. *Nut* undeveloped.

Ireland. H.20, Wicklow; marsh south of Mizen Head, behind dunes, 5th July 1946, *A. W. Stelfox.*

This hybrid differs from *C. riparia* in its much narrower leaves, its more slender male spikes, the longer and more slender peduncles of its female spikes, its pale-margined scales, and its more slenderly beaked, sterile utricles. From *C. vesicaria* it differs in its glaucous leaves, and its darker and smaller sterile utricles.

I have not hitherto seen specimens which I have been able to recognize as undoubted hybrids between *C. riparia* and *C. vesicaria*.

MINT NOTES

By R. Graham.

I. MENTHA RUBRA

Mentha rubra Miller. The earliest use of the binomial *Mentha rubra* appears in the 8th Edition of Miller's (1768) *Gardener's Dictionary*, with the following description: " Mentha (Rubra) spicis confertis interruptis, foliis oblongo-ovatis acuminatis dentatis sessilibus. *Mint with interrupted spikes of flowers growing together, and oblong, oval, acute-pointed, indented leaves, sitting close to the stalk.* Mentha rotundifolia rubra, aurantii odore. Mor. Hist., 3, 369. *Round-leaved red Mint, smelling like an Orange, commonly called Orange Mint.*" On the page following that on which the above formal description appears Miller further says: " *The ninth sort* [i.e., *Mentha rubra* Miller] *is commonly called Orange Mint, from its scent, which is somewhat like that of the rind of Orange. This rises with an upright smooth stalk about the same height with the common Mint, but does not branch out like that; the leaves are much broader than those of the common sort; the indentures on their edges are deep, and they end in acute points. The spikes of flowers grow in clusters on the top of the stalks, which are interrupted; they are of a pale colour, and their stamina are shorter than the petal. It is commonly cultivated in gardens for its pleasant scent.*"

In Miller's above description the reference to Morison's Orange Mint (*M. citrata* Ehrh. = *M. odorata* Sole) is erroneous. Smith (1800: Observations on the British Species of Mentha: *Transactions of the Linnean Society, 5*, 188) points this out in a long paragraph. This reference should be consulted, together with a sheet in Smith's herbarium (at the Linnean Society) which bears two specimens named " *Mentha rubra* Miller " in Smith's own handwriting. The following, however, is the substance of Smith's remarks.

Smith states that Miller named his *M. rubra* from two specimens, which later came into Smith's possession. These specimens are not Morison's Orange Mint, as indeed Miller would have realised had he consulted Morison's figure, but, as they happened erroneously to bear the formula for Morison's Orange Mint, Miller described them, and included the erroneous reference on the herbarium sheet as a synonym in the latter part of his description.

Unfortunately it is not yet possible to know exactly which mint was intended by Miller to apply to the name *Mentha rubra*. The two specimens, referred to above, are different mints. One is the hybrid of *Mentha viridis* L. with *M. rotundifolia* (L.) Huds. (=×*M. cordifolia* Opiz) and the other is the plant sometimes considered a laciniate-leaved variety of *M. viridis* L., but which is more probably a spicate sport of

×*M. crispa* L. Evidence is incomplete as to whether Miller intended one or both of these specimens to be covered by his name *M. rubra*, and there is the possibility here of a *nomen confusum*, but it is to be hoped that further specimens will be forthcoming to enable a decision to be made to establish *Mentha rubra* Miller as applying to one hybrid or the other.

×**Mentha Smithiana** R. Graham, nom. nov. (*M. rubra* Smith, 1800: *Trans. Linn. Soc.*, *5*, 205; haud Mill., 1768).

The type sheet is in Smith's herbarium at the Linnean Society. It is necessary to comment on Smith's use of the adjective *tubuloso-campanulatus* in describing the shape of the calyx of both *M. rubra* and *M. gentilis*. Modern usage has differentiated between *tubular* and *campanulate*, the former being indicative of the calyx in the *M. Smithiana* group and the latter in the *M. gentilis* group. In Smith's description of his *M. rubra* the word *tubuloso-campanulatus* should be translated as *tubular* as opposed to *campanulate*; the same adjective, in his description of *M. gentilis*, should be read as *campanulate*.

Hudson's *M. rubra* appears in 1778: *Flora Anglica*, Ed. 2, *1*, 252, but is doubly illegitimate, being a later homonym of *M. rubra* Miller and being used in place of the older name *M. gentilis* L. As no specimen of Hudson's *M. rubra* appears to exist (many of his specimens were destroyed by fire) it is impossible to tell, as a matter of interest, whether his plant was the same as Smith's *M. rubra*, which is at least highly possible.

×Mentha Smithiana R. Graham var. **angustifolia** R. Graham, var. nov. Differt a typo foliis lanceolatis acutis.

Stem about 2 feet high, rather slender and flexuous, branched below the main axis, greenish-purple becoming more purple above, more or less glabrous throughout or with a few scattered white hairs, especially under the nodes. Internodes 2 to 5 cms. Leaves lanceolate to narrow-lanceolate, broadest below the middle, gradually attenuate to an acute apex and more shortly attenuate to the long basal petiole, acutely but rather shallowly serrate with teeth directed forwards, glabrous above or with a few scattered hairs mainly on the veins, very thinly hairy beneath; largest leaves 3 × 6.5 cms.; serratures 10 to 14 on each side. Petioles 3 cms. long on largest leaves. Bracts similar to the leaves, gradually reduced in size upwards with correspondingly shorter petioles, the uppermost more or less entire, very narrow, just exceeding the verticils. Verticils large, the lower ones pedunculate. Pedicels greenish-purple or purple, glabrous or with occasional horizontally-spreading white hairs. Bracteoles 4 to 5 cms. long, very narrowly lanceolate, glabrous or with a few scattered short white hairs on the margin. Calyx-tube tubular, glandular, glabrous, with teeth rather over half the length of the tube. Stamens included.

This most unusual-looking mint was discovered by Mr F. M. Day beside a stream at Stoke Gabriel, South Devon, v.-c. 3, in 1938. The above description is taken from the type specimen which was collected

in the subsequent year, and is among Mr Still's mints at the British Museum. The chief distinction from type ×*M. Smithiana* R. Graham lies in the narrowly lanceolate leaves and bracts, which, in extreme cases, become three times as long as broad and bear a strong resemblance to the leaves of ×*M. cardiaca* Baker. It is, however, readily distinguished from both the *M. cardiaca* group and the *M. gentilis* group by the calyx-tube, which is tubular as opposed to campanulate, and by the large verticils and subspicate inflorescence, which, though sometimes occurring in these two groups, are both common characters of the *M. Smithiana* group.

A HYBRID THISTLE FROM WILTSHIRE

By J. D. Grose.

× Cirsium semidecurrens Richter 1830: Klett & Richter, *Fl. Leipzig*, 673. *Cirsium palustre* (L.) Scop. × *C. tuberosum* (L.) All.

This hybrid was first found in Britain at Nash Point, Glamorgan, and briefly recorded by Mr J. S. L. Gilmour (1933: *J. Bot.*, *71*, 17). Constant search has been made for it in Wiltshire during the last ten years, and in July 1947 a small colony was discovered at Great Ridge, S. Wilts. (v.-c. 8), whence *C. tuberosum* was first recorded for Britain by Lambert in 1812. The locality is the northern slope of an open chalk pasture, alt. c. 600 feet. In addition to the common downland species, the following plants were associated: *Serratula tinctoria*, *Succisa pratensis* and a very little *Genista tinctoria*. More remarkable was the occurrence of *Trifolium medium*, *Hypericum hirsutum* and *H. pulchrum*, all in very small quantities. The presence of the two last on an exposed chalk down, totally devoid of any shelter, must be almost unique. It may indicate that this ground was once woodland, and it is worth recalling that the early notices of *C. tuberosum* describe the locality as "Great Ridge Wood."

Six flowering stems of ×*C. semidecurrens* were seen, and I append a description of the specimen gathered:

Stem c. 60 cm. high, erect, unbranched, grooved, purplish from above to near the base, very slightly *spinous-winged* in two places near the centre (this character was absent in the other five stems), clothed with sparse arachnoid pubescence and many jointed hairs below and with dense arachnoid pubescence and scattered jointed hairs above. Radical leaves petiolate, c. 14 × 6 cm., oblong-lanceolate, pinnatipartite with pinnatifid segments, softly spinous-margined with yellow spines, both surfaces with scattered jointed hairs. Cauline leaves similar but smaller, to 2.5 cm. and *strongly decurrent*. Capitula 4, racemose, on densely-felted peduncles 1.5 cm. long. Pericline globular, arachnoid. Phyllaries appressed, spinous-tipped, middle ones with glandular dorsal nerves. Inner phyllaries similar but purplish. Florets purple, darker in colour than those of *C. tuberosum*. Limb of corolla exceeding tube. Achenes abortive, shrivelled.

In appearance the plant is a good intermediate between the parents. The purple coloration, short peduncles, glandular, attenuate phyllaries, decurrent petioles and the rudiments of a spinous wing on the stem show the influence of *C. palustre*, while the arachnoid pubescence of the unbranched stem and the armature of the broad, divided radical leaves are evidence of *C. tuberosum*. The floral dimensions of the tube/limb ratio are just intermediate.

I am indebted to Dr W. A. Sledge for his kind help in preparing this description.

ADDITIONS AND CORRECTIONS TO THE COMITAL FLORA, FOR MIDDLESEX

By Douglas H. Kent.

The object of this paper is to make as complete and accurate as possible the list of species on record for v.-c. 21 in the *Comital Flora*.

The literature of Middlesex botany contains many records which have for some reason been ignored in *Comital Flora*. This is especially noticeable in the case of many of the pre-Linnaean works, and instances occur where a Middlesex locality is cited as the first British record, yet v.-c. 21 is omitted from the list of county records, e.g., 425/2. *Lactuca Serriola*.

A number of the plants recorded are merely casual, while others have not been seen for many years, but where there is sufficient evidence that a plant did once occur in the county and is now presumably extinct it is included thus:—⟨21⟩. Certain other species already on record for the county in the *Comital Flora* have also not been seen for many years, and so here again, where there is good evidence that a plant is probably now extinct, I have added ⟨ ⟩ to the record.

Alien species are marked with a dagger, and records new to the county with an asterisk.

In conclusion, there are in the *Comital Flora* a number of records for Middlesex for which I can find no evidence:—*Vicia tenuifolia*, *Taraxacum paludosum*, *Linaria Pelisseriana*, and *Chenopodium botryoides*. There are no specimens of any of these plants from v.-c. 21 in Herb. Druce.

Grateful thanks are due to Mrs B. Welch for much useful assistance in work in the field, to Messrs A. J. Wilmott, J. E. Lousley and E. F. Warburg for many useful suggestions and much helpful advice in preparing this paper, and to Messrs J. F. G. Chapple and J. W. Haines respectively for supplying detailed information from Herb. Druce and Herb. Montgomrey.

6/24. Ranunculus heterophyllus Weber. Twickenham: T. Twining in Hb. Watson. Southall. 1902; Hb. Drabble. Hampstead; Druce (1910). Add to *C.F.*

21/6. Papaver hybridum L. Chelsey (=Chelsea) fields, as also in those belonging to Hammersmith . . . Mr Robert Lorkin and I: Johnson (1633, 373). Cornfields about Chelsea: Petiver (1695). Frequent among corn. Harefield; Blackstone (1737, 71). Add to *C.F.*

†24/1. Roemeria hybrida DC. Casual near Potter's Bar: Cooper (1914). Add to *C.F.*

31/1. CORYDALIS CLAVICULATA (L.) DC. In the hedges near Bonner's Row, Bethnal Green; MS. note by Alchorne quoted in *Phyt.*, *3*, 166. Add [21?] to *C.F.*

32/1. FUMARIA CAPREOLATA L. All Middlesex records are errors for *F. purpurea* Pugsl. or *F. Boraei* Jord. Delete from *C.F.*

32/12. F. VAILLANTII Lois. The inclusion of this plant in brackets in the *Comital Flora* is probably based on Benbow's Chiswick plant. The specimen has been determined by H. W. Pugsley as a monstrous form of *F. officinalis* L. Delete from *C.F.*

*36/5. BARBAREA INTERMEDIA Boreau. Uxbridge, 1888; Hb. Benbow; confirmed by A. B. Jackson. Add to *C.F.*

45/5. COCHLEARIA ANGLICA L. Not recorded since Trimen & Dyer (1869, 422). Enclose record with ⟨ ⟩.

†61/2. LEPIDIUM LATIFOLIUM L. Abundant by the Colne about Drayton Ford and Springwell, 1939; D. H. Kent. Canal bank in several places bet. Harefield and Springwell. 1945; B. Welch. Add (21) to *C.F.*

88/11. VIOLA PALUSTRIS L. Now extinct at Hampstead. Enclose record with ⟨ ⟩.

88/15. V. VARIATA Jord. Harefield; Mrs Drabble, *B.E.C. 1936 Rep.*, 1937, 320. Add to *C.F.*

88/22. V. AGRESTIS Jord. Fulwell; W. H. Brown, Drabble (1909). Add to *C.F.*

88/23. V. SEGETALIS Jord. Pinner; W. A. Walkin, det. E. Drabble, *B.E.C. 1929 Rep.* (1930), 458. Add to *C.F.*

*†96/6. SILENE QUINQUEVULNERA L. Field near Whitton Park, 1907; Hb. Montgomrey. Add to *C.F.*

†96/10. S. NUTANS L. Casual on Hackney Marshes; Cooper (1914). Add (21) to *C.F.*

101/4. STELLARIA NEGLECTA Weihe. Chiswick and Isle of Dogs; Trimen *MS.* Edgware; Druce (1910). Add to *C.F.*

103/9. SAGINA REUTERI Boiss. Drayton; Druce (1910). There is no specimen in Hb. Druce and the species is much misunderstood. Add [21?] to *C.F.*

†108/1. CLAYTONIA ALSINOIDES Sims. Turner's Wood, Finchley, 1945; R. S. R. Fitter, det. at Kew. Add to *C.F.*

112/17. HYPERICUM ELODES L. On the great bog on Hampstead Heath; Blackstone (1746, 39). Now extinct. Add ⟨21⟩ to *C.F.*

123/1. TILIA PLATYPHYLLOS Scop. Planted with other species at Syon, and at Hampton Court; Smith (1828, *3*, 20). At Hampstead; Irvine (1838, 181). Add (21 planted) to *C.F.*

125/1. LINUM BIENNE Mill. Above Harefield Quarry, 1946; B. Welch. Add to *C.F.*

†128/2. ERODIUM MOSCHATUM (Burm.) L'Hérit. Laleham, 1815; Hb. Goodger and Rozea ex Trimen & Dyer (1869, 69). Add (21) to *C.F.*

†133/4. IMPATIENS GLANDULIFERA Royle. Bet. Harefield and Denham; *Phyt. N.S., 1,* 166. Banks of the Thames about Brentford and Isleworth, 1938, and banks of the Brent about Ealing, Hanwell and Greenford, 1939; D. H. Kent. Add to *C.F.*

155/8. TRIFOLIUM MARITIMUM Huds. Gathered . . . by the Thames side near the Earl of Peterborough's Palace (site of present day Millbank, S.W.1) by Joseph Andrews and John Field . . . probably before 1721; Boulger (1918). This and other suitable localities have long been built over. Add ⟨21⟩ to *C.F.*

†178/1. LATHYRUS LATIFOLIUS L. Established on a railway bank near Hounslow, 1938; D. H. Kent. Waste land near the river at Chiswick, 1945; J. E. Lousley, B. Welch and D. H. Kent. Add to *C.F.*

†178/2. L. SYLVESTRIS L. Near Uxbridge, 1900; Hb. Benbow. Near Scratch Wood, Edgwarebury, 1946; Miss J. Simmonds. Add (21) to *C.F.*

†178/3. L. TUBEROSUS L. Chiswick embankment of Thames, 1933, still there 1937; E. B. Bangerter, det. A. J. Wilmott, *B.E.C. 1937 Rep.* (1938), 474. Add to *C.F.*

194/12. ROSA AFZELIANA Fries. Harefield and Stanmore; Druce (1910). A very critical species of which there are no Middlesex specimens in Hb. Druce. Add [21?] to *C.F.*

*194/19. R. TOMENTOSA Sm. Roxeth, 1886, and Perivale, 1887; Hb. Benbow. Add to *C.F.*

205/1. PARNASSIA PALUSTRIS L. The locality north of Harefield has been destroyed by gravel digging operations. Enclose record with ⟨ ⟩.

210/1. COTYLEDON UMBILICUS-VENERIS L. Upon Westminster Abbey over the doore that leadeth from Chaucer his tombe to the old palace; Gerarde (1597, 424). In this place it is not now to be found; Johnson (1633, 529). In a gravel pit near Highberry barn; Martyn (1763, 71). Add ⟨21⟩ to *C.F.*

213/3. DROSERA ROTUNDIFOLIA L. Survived at Harrow Weald until about 1934 but is now lost to the county. Enclose record with ⟨ ⟩.

217/3. CALLITRICHE PALUSTRIS L. Pinner; W. R. Linton, *B.E.C. 1884 Rep.* (1885), 107. Add to *C.F.*

†220/7(2). EPILOBIUM ADENOCAULON Haussku. Bombed site, Suffolk Lane, E.C.4, 1945; J. E. Lousley, det. G. M. Ash. Frequent and increasing throughout the county, 1947; D. H. Kent. Add to *C.F.*

220/9. E. LANCEOLATUM Seb. & Maur. Wapping, 1945; J. E. Lousley. Add to *C.F.*

245/5. BUPLEURUM TENUISSIMUM L. Not recorded since Trimen & Dyer (1869, 126). Enclose record with ⟨ ⟩.

265/6. OENANTHE LACHENALII C. C. Gmel. Not recorded since Trimen & Dyer (1869, 127). Enclose record with ⟨ ⟩.

†291/1. LONICERA CAPRIFOLIUM L. Enfield; Hodson & Ford (1873), 149. Add to *C.F.*

†295/1. RUBIA PEREGRINA L. Rubbish heaps at West Drayton; Miss A. Cobbe, *B.E.C. 1916 Rep.* (1917), 489. Add (21) to *C.F.*

*296/3. GALIUM ERECTUM Huds. Uxbridge, 1884; Hb. Benbow. Add to *C.F.*

298/3. ASPERULA CYNANCHICA L. Middlesex, 1862; Hb. Benbow. The following note in Benbow's handwriting is on the specimen sheet:—" Collected in Middlesex, but label mislaid. I believe it was found on the chalk at Harefield, but have not met with it since." The locality is a likely one. Add [21] to *C.F.*

*304/4. VALERIANELLA CARINATA Lois. North west of Harefield, 1886; W. R. Linton in Hb. Mus. Brit. Very abundant in Harefield chalkpit, 1889; Hb. Benbow. Still at Harefield, 1945; D. H. Kent. Add to *C.F.*

318/19. ASTER TRIPOLIUM L. Not recorded since about 1886, all the old localities in the Isle of Dogs have now been built over. Enclose record with ⟨ ⟩.

†368/1. ANTHEMIS TINCTORIA L. Uxbridge and Alperton; Druce (1910). Yiewsley and Finchley; Cooper (1914). Golder's Green; *London Nat., 1932*, 59. Chiswick, 1942; J. E. Lousley. Site of the Churchyard of St Olaves, Silver Street, London, E.C.2, 1944; D. McClintock, *B.E.C. 1943-44 Rep.* (1946), 730 and 748. Add to *C.F*

391/1. CARLINA VULGARIS L. In the old chalk pit at Harefield, plentifully; Blackstone (1737, 16). Warren Gate; Hb. Benbow. Add to *C.F.*

410/1. ARNOSERIS MINIMA (L.) S. & K. In Hampton Court Park abundantly and in the fields thereabouts; Sam. Doody, Ray (1696, 373). In Teddington field, plentifully; Blackstone (1746, 42). Now lost to the county. Add ⟨21⟩ to *C.F.*

425/2. LACTUCA SERRIOLA L. Now abundant throughout the county on waste land and by roadsides, 1938; D. H. Kent. Add to *C.F.* (q.v. for earlier record).

427/1. SONCHUS PALUSTRIS L. About Blackwall; Ray (1696), 71. On the banks of the Thames in the Isle of Dogs; Petiver (1715). Sparingly in the marshes about Blackwall and Poplar; Curtis (1798). Not recorded since Trimen & Dyer (1869, 176). Add ⟨21⟩ to *C.F.*

467/1. ANAGALLIS TENELLA Murr. On Harefield Moor, abundantly; Blackstone (1737, 65). On Hampstead Bog; Blackstone (1746, 60). Now extinct. Add ⟨21⟩ to *C.F.*

469/1. SAMOLUS VALERANDI L. Not recorded since Trimen & Dyer (1869), 228. Habitat destroyed by the industrial development of the Isle of Dogs. Enclose record with ⟨ ⟩.

480/8. GENTIANA GERMANICA Willd. Chalky field near Harefield, 1892; Hb. Benbow. Still there 1946; D. H. Kent. Add to *C.F.*

*†506/7. MYOSOTIS SYLVATICA (Ehrh.) Hoffm. Meadow by canal above Denham, Middx., 1892; A. H. Wolley-Dod in Hb. Mus. Tun. Wells. Harefield, 1946; B. Welch, conf. A. E. Wade. A plant of doubtful status in Middlesex, and probably always an escape from cultivation. Add (21) to *C.F.*

515/2. CUSCUTA EUROPAEA L. Between Shepperton and Chertsey Bridge, 1901; Hb. Green. Near Staines, 1920; W. R. Sherrin in Hb. South Lond. Bot. Inst. Thames bank opp. Chertsey, 1942; J. E. Lousley, *B.E.C. 1941-2 Rep.* (1944), 497. Still there 1948. Remove from brackets in *C.F.*

550/1. OROBANCHE RAPUM-GENISTAE Thuill. Not recorded since Hodson & Ford (1873, 150). Enclose record with ⟨ ⟩.

552/5. UTRICULARIA MINOR L. Not recorded since Cullum (1774, 6). Enclose record with ⟨ ⟩.

562/7. SATUREIA NEPETA (L.) Scheele. Lane leading to the river at Harefield; De Crespigny (1877, 9). There do not appear to be any herbarium specimens and the record needs confirmation. Add [21?] to *C.F.*

*604/4. BETA MARITIMA L. Isle of Dogs, 1887; Hb. Benbow. Add to *C.F.*

†628/9. EUPHORBIA VIRGATA Waldst. & Kit. Between Ealing and Alperton, 1887; Hb. Benbow: canal bank near Southall, 1945; D. H. Kent: both det. A. J. Wilmott. Wyke Green, 1946, East Finchley and Yeading, 1947, East Acton, 1948; D. H. Kent. Add to *C.F.*

†628/11. E. CYPARISSIAS L. Uxbridge, 1886—an escape from cultivation; Hb. Benbow. Railway bank near Kilburn, 1946; D. H. Kent. Add (21) to *C.F.*

633/6. ULMUS STRICTA Lindl. By the Brent at Park Royal; A. B. Jackson, *B.E.C. 1911 Rep.* (1912), 121. Add to *C.F.*

641/1. MYRICA GALE L. On Hunslow (=Hounslow) Heath; Merrett (1666, 82). Hampstead Heath, a single large old tree, nearly dead, 1887; Hb. Benbow. Now extinct in Middlesex. Add ⟨21⟩ to *C.F.*

†651/3. POPULUS NIGRA L. Syon House Grounds—two immense trees; Jackson (1910). Add (21 planted) to *C.F.*

653/1. CERATOPHYLLUM SUBMERSUM L. Canal backwater north of Southall, 1947; B. Welch, J. E. Lousley, J. E. Woodhead and D. H. Kent. Add to *C.F.*

†655/1. STRATIOTES ALOIDES L. Enfield; Hodson & Ford (1873, 150). Abundant and completely naturalized in Julius Caesar's Ponds, Little Common, Stanmore, 1940; D. H. Kent. Add (21) to *C.F.*

669/1. ORCHIS PURPUREA Huds. In the chalk pit near the paper mill at Harefield, plentifully; Blackstone (1737, 67). The plant may have been a form of *O. militaris* L. Add [21?] to *C.F.*

669/2. O. MILITARIS L. Not recorded since Benbow (1885). Enclose record with ⟨ ⟩.

669/4. O. USTULATA L. Not recorded since Blackstone (1737, 69). Enclose record with ⟨ ⟩.

676/2. IRIS FOETIDISSIMA L. Not recorded since Trimen & Dyer (1869, 274). Enclose record with ⟨ ⟩.

†690/2. ASPARAGUS OFFICINALIS L. Old wall near Gunnersbury railway station, 1874; R. A. Pryor in Trimen *MS.* Roadside near Chiswick, 1946, and bank of River Fray's near Uxbridge, 1948; D. H. Kent. Add to *C.F.*

†702/7. ALLIUM TRIQUETRUM L. Not recorded since Watson (1883). Enclose record with ⟨ ⟩.

702/9. A. OLERACEUM L. Not recorded since Trimen & Dyer (1869, 280). Specimens in Hb. Watson were collected in 1856. Enclose record with ⟨ ⟩.

708/1. LILIUM MARTAGON L. Not recorded since *Phyt. N.S. 6.* (1862), 573. Enclose record with ⟨ ⟩.

718/15. JUNCUS GERARDI Lois. Not recorded since De Crespigny, *Bot. Loc. Rec. Club 1878-79 Rep.* (1880), 19. Enclose record with ⟨ ⟩.

737/27. POTAMOGETON TRICHOIDES Cham. & Schlecht. Ditch near Springwell Lock, 1884; Hb. Benbow. Staines, 1885; J. Fraser in Hb. Kew; still there 1947. All det. J. E. Dandy and G. Taylor. Add to *C.F.*

†744/1. CYPERUS LONGUS L. Verge of lake, Syon Park, 1947; L. G. & R. M. Payne; originally planted, but now completely naturalized. Add (21) to *C.F.*

*745/3. HELEOCHARIS MULTICAULIS (Sm.) Sm. About Harefield Lock, 1884; Hb. Benbow. Add to *C.F.*

746/4. SCIRPUS TABERNAEMONTANI C. C. Gmel. Not recorded since about 1700. Enclose record with ⟨ ⟩.

746/5. S. TRIQUETER L. The localities by the Thames have now been destroyed by the combined efforts of dredging and the building of the river wall. Enclose record with ⟨ ⟩.

746/7. S. CAESPITOSUS L. Not recorded since Blackstone (1737), 91. Enclose record with ⟨ ⟩.

746/14. S. COMPRESSUS (L.) Pers. Not recorded since about 1800. Enclose record with ⟨ ⟩.

*753/7. CAREX ROSTRATA Stokes. Marshy meadow near Tuddington (=Teddington), 1792; Forster *MS*. Not recorded since. Add ⟨21⟩ to *C.F.*

753/61. C. PAIRAEI F. Schultz. Hampton Court, 1945; B. Welch. Chiswick, 1945; B. Welch & D. H. Kent. Wyke Green, Elstree and near Hillingdon, 1946; D. H. Kent. All det. E. Nelmes. Add to *C.F.*

753/61(2). C. POLYPHYLLA Kar. & Kir. Above Harefield Quarry, 1945; D. H. Kent, det. E. Nelmes. Add to *C.F.*

*753/75. C. DIOICA L. Marshy meadow near Tuddington, 1792; Forster *MS*. Not recorded since. Add ⟨21⟩ to *C.F.*

†780/1. AGROSTIS SEMIVERTICILLATA (Forst.) C. Chr. Acton; Druce (1910). Near Uxbridge, 1919; L. B. Hall and W. R. Sherrin in Hb. South Lond. Bot. Inst. Add (21) to *C.F.*

780/2(2). A. GIGANTEA Roth. " Specimens from Jewin Street and Fetter Lane determined by Mr C. E. Hubbard "; J. E. Lousley, *B.E.C. 1943-4 Rep.* (1946), 881. The var. *dispar* (Michx.) Philipson is frequent on waste ground throughout the county, 1946; D. H. Kent. Add to *C.F.*

785/1. APERA SPICA-VENTI (L.) Beauv. Harefield, frequent; Blackstone (1737, 34). East Acton, 1847; G. B. Denner in Hb. Kew. Teddington; Irvine (1838, 94). Harmondsworth and Stanwell, 1945; B. Welch & D. H. Kent. Hanwell, 1946; D. H. Kent. Add to *C.F.*

794/3. AVENA PRATENSIS L. Home Park, Hampton Court, 1943; B. Welch. Remove from brackets in *C.F.*

†797/1. CYNODON DACTYLON (L.) Pers. Near the river bridge at Hampton Court; Miss Bacon, *B.E.C. 1925 Rep.* (1926), 904. Add to *C.F.*

†808/1. CYNOSURUS ECHINATUS L. Casual at Harefield, 1910; Cooper (1914). Abundant at West Drayton, 1928; G. C. Druce, *B.E.C. 1928 Rep.* (1929), 766. Add to *C.F.*

825/3(2). Glyceria declinata Bréb. West Drayton, 1942; D. H. Kent. Bushey Park, 1945; B. Welch. Near Hounslow Heath, 1948; C. E. Hubbard and D. H. Kent. Add to *C.F.*

827/19(2). Bromus lepidus Holmb. Finsbury Park, 1871; A. French in Hb. Mus. Brit. Upper Thames Street near Dowgate Hill, 1945; J. E. Lousley in Hb. Kew. Hanwell, 1945; D. H. Kent, det. C. E. Hubbard. Hounslow Heath; C. E. Hubbard & D. H. Kent. Add to *C.F.*

828/2. Brachypodium pinnatum (L.) Beauv. Duck's Hill Heath, bet. Ruislip and Northwood, 1892; Hb. Benbow. Still there 1945; B. Welch. Add to *C.F.*

836/3. Elymus europaeus L. Garett Wood, near Harefield, 1886-9; Hb. Benbow. Denham (Middx.); C. E. Marks, *B.E.C. 1935 Rep.* (1936), 48. Add to *C.F.*

839/1. Juniperus communis L. Not recorded since Martyn (1763, 66). Enclose record with < >.

†868/1. Azolla filiculoides Lam. On page 390 of *C.F.* for Pindon, Middlesex, read Pinner, Middlesex.

876/5. Chara hispida L. Finchley Common; J. Woods, Turner & Dillwyn (1805, 254). Ruislip Common; De Crespigny (1877, 80). There appear to be no herbarium specimens, but the stations are likely ones. Add 21? to *C.F.*

PROBABLE ERRORS.

The following plants have also been recorded for Middlesex, but the stations are in some cases impossible, and in others extremely unlikely. The records have all been ignored in the *Comital Flora*, and confirmation by specimens is needed before their inclusion can be accepted.

3/1. Anemone Pulsatilla L. On a bank of the edge of the upper heath, Hampstead; a small bed of it among the whitethorn trees going to the Leg of Mutton Pond; White (1900, 363). Two ridiculous statements, though it is difficult to imagine the plants intended unless they be colour forms of *Anemone nemorosa* L.

45/2. Cochlearia officinalis L. Casual at Bedford Park; Cockerell (1887).

127/3. Geranium sylvaticum L. Regent's Park, Webster (1911), 102. Perhaps planted there.

166/1. Astragalus glycyphyllos L. Woods about Harefield; De Crespigny (1877, 6). This is an old record quoted by De Crespigny. It was not confirmed by him, and I am unable to trace its origin. While there are many suitable localities for this species at Harefield, I consider it most unlikely that such a conspicuous plant

should have been overlooked by Blackstone. The absence of a record in Blackstone (1737) throws considerable doubt upon the occurrence of the species in Middlesex.

176/1. VICIA SYLVATICA L. Hampstead; Cochrane (1889, 119). Regent's Park, Webster (1911, 102). Both records probably refer to *V. sepium* L.

446/7. ERICA VAGANS L. Hampstead Heath, rare; "G.A." (1902). An impossible record, unless deliberately planted.

671/1. ACERAS ANTHROPOPHORUM (L.) R. Br. Old chalkpits near Harefield (?); De Crespigny (1877, 35). An old record quoted by De Crespigny, but unconfirmed by him. It would be interesting to know the origin of this record, but I am unable to trace it. There appears to be no other record for the county.

718/8. JUNCUS SUBNODULOSUS Schrank. Hampstead Heath; De Crespigny (1877, 35). No doubt some other species intended.

747/1. ERIOPHORUM LATIFOLIUM Hoppe. Beside the watercourse on Hampstead Heath, abundant 1874; lost 1895; White (1900, 364). Almost certainly an error.

753/58. CAREX CURTA Good. Lanes in a hollow near Neasden; De Crespigny (1877, 12). Possibly a form of *C. remota* L. was mistaken for it.

753/65. C. DIANDRA Schrank. A tuft or two at the side of the Paddington Canal near Willesden Junction; De Crespigny (1877, 13). Perhaps a slender form of *C. Otrubae* was the plant intended.

848/1. ADIANTUM CAPILLUS-VENERIS L. Found in various parts of . . . Middlesex; Russell & Price (1769, 2. 219). An error.

865/1. BOTRYCHIUM LUNARIA (L.) Sw. Found on many of the commons . . . of Middlesex . . . particularly near Acton; Russell & Price (1769, 2. 218). Perhaps *Ophioglossum vulgatum* L. intended.

SOURCES OF RECORDS.

Besides published sources given in the list of references, the three following MSS., all now in the British Museum (Natural History), have been used:—

Forster *MS.*: MS. Botanical Note Books, compiled by Edward Forster, 1791-4.

Trimen *MS.*: H. Trimen's interleaved copy of Trimen and Dyer (1869), containing numerous notes and additions by J. Britten, R. Pryor, W. W. Newbould, E. Varenne, J. L. Warren and many others: the records are mainly from 1869-80, though there are a few isolated notes dated as late as 1904.

Williams *MS.*; an unfinished MS. *Flora of Middlesex*, compiled by F. N. Williams, containing many records by C. B. Green, A. B. Jackson, A. Wood and others: the records date from 1860-1910.

Specimens in the following herbaria are also cited:—J. Benbow (now in Herb. Mus. Brit.); E. and H. Drabble (now in Herb. Mus. Brit.); C. B. Green (now in Herb. South London Bot. Inst.); Kew; A. Loydell (now in Herb. Druce, Oxford); Montgomrey (now in Herb. J. W. Haines, Gloucester); British Museum (Natural History); Tunbridge Wells Museum; South London Botanical Institute.

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Hodson, G. H., and Ford, E.; 1873: *A History of Enfield.*

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Johnson, T.; 1633: *The Herball, or General Historie of Plantes by John Gerarde; very much enlarged and amended.*

Martyn, T.; 1763: *Plantae Cantabrigienses . . . to which are added lists of the more rare plants growing in many parts of England and Wales.*

Merrett, C.; 1666: *Pinax Rerum Naturalium Britannicum.*

Petiver, J.; 1695: More rare plants growing wild in Middlesex; in Edmund Gibson's translation of Camden's *Britannia.*

—— : 1715: *Herbarii Britannici clariss. D. Raii Catalogus cum Iconibus ad vivum delineatis.*

Ray, J.; 1696: *Synopsis Methodica Stirpium Britannicarum, Ed. 2.*

Russell, P., and Price, O.; 1769: *England Displayed: Being a new, complete and accurate survey and description of the Kingdom of England and Principality of Wales*; 2 vols.

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STUDIES IN THE BRITISH EPIPACTIS

By D. P. Young.

I. EPIPACTIS DUNENSIS AND E. PENDULA

The three last decades have seen a steady advancement in our understanding of the self-fertilised or autogamous *Epipactis*, which had previously, in common with the rest of the genus, been thoroughly misunderstood. Godfery, in 1920-6, described *E. leptochila*, *E. dunensis* and the Continental *E. Muelleri*, and clearly distinguished the essential characteristics of each. However, only in the last eight years or so has it been recognised that other, and highly distinct, species exist. Brooke and Rose in 1940 pointed out that plants, particularly notable for their very pendulous flowers, and which had previously been dismissed as "degenerate" forms of *E. leptochila*, were actually unrelated to the latter; to cover these they used the name *E. vectensis*, based on the varietal name used earlier by Stephenson and Stephenson (1918). The following year Thomas (1941) reported that a related plant, which he named *E. pendula*, grew with *E. dunensis* in the plantations on the Lancashire sand-dunes, and a similar one—still *sub judice*—occurred in South Wales.

It seems opportune to make a survey of some of the autogamous British species, adding some further observations which will serve to distinguish them. One may state at the outset, however, that the study of these plants is still very far from complete, and the understanding of their origin and affinities even more so. For this reason, the time is not yet ripe for any major modifications in taxonomy, which may have to be made later. The present survey will therefore be almost entirely descriptive, and so will be from the field botanist's point of view. However, as further material is badly needed for the continuance of the study of the genus, if this account encourages interest in the search for further examples of this group of plants, it will have served its purpose.

Epipactis leptochila may be dismissed briefly, not as being well understood, but rather because it is at least better known than the other autogamous species, and is much less locally distributed, occurring in England over a broad band from Kent and Bedford to Shropshire and into South Wales. It is, like *E. Helleborine* Crantz, a rather variable plant In this connection it should also be noted that, as is commonly the case with self-fertilised and apomictic groups, and especially where, as here, the plants occur in small and widely-separated colonies, different colonies tend to acquire diverging characters, so that it is frequently difficult to decide the precise taxonomic status of different races. A plant, apparently closely related to *E. leptochila*, is described by C. Thomas in Riddelsdell, Hedley and Price (1948), as *E. cleistogama*.

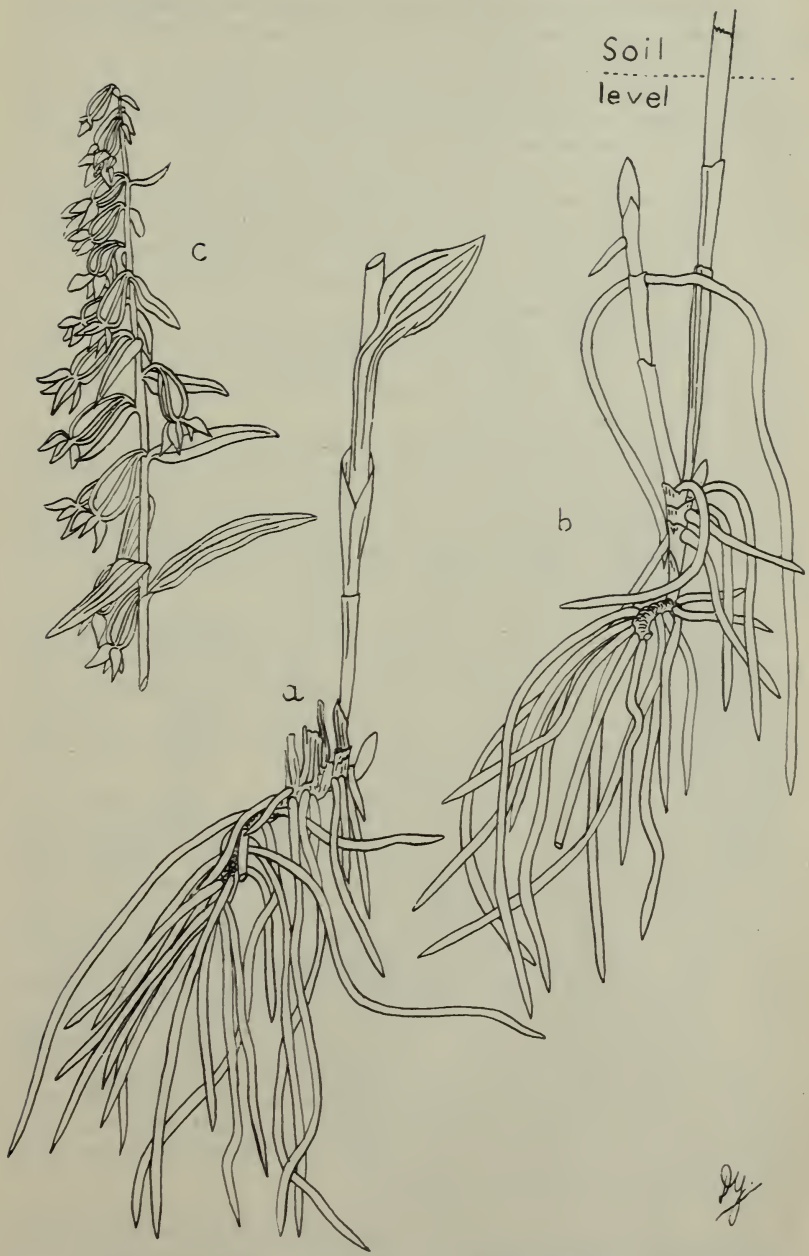

Fig. 1. *Epipactis pendula*: (*a*) normal root system: (*b*) branched rhizome: (*c*) fruit of Bedfordshire form. All $\times\frac{1}{2}$.

I will commence, then, with an account of the two Lancashire sand-dune species, and follow with a discussion of the relationship between *E. pendula* and *E. vectensis*.

E. dunensis, known in Britain only from Lancashire (v.-c.'s 59 and 60) and Anglesey (v.-c. 52), was first observed growing, usually amongst *Salix repens*, in somewhat peaty but not moist hollows in the coastal dunes. Here it answers to the description usually applied to it, *viz.*, a weak slender plant, not much above 30 cm. in height, with rather small flowers, often 6-10 or less in number, and the whole plant of a characteristic yellow-green colour. As will be seen in a moment, this must really be regarded as a depauperate form resulting from the unfavourable nature of its ordinary habitat.

E. pendula was first discovered by Thomas in the pine plantations at Formby (v.-c. 59), and as it occurs in some quantity in this well-explored area, and is of distinct appearance, it is very curious that it had not been noticed previously.

Growing with it in the plantations is the robust dark-green form of *E. dunensis* that has arisen from continuous growth under the trees, which have been there for just over half a century; that the plants grow larger and of a richer green in the pine plantations has been noted previously (Godfery, 1931; Thomas, 1941), but no detailed account of this interesting state or form appears to have been published. It is proposed to call it f. *pinetorum*.

Epipactis dunensis (T. & T. A. Steph.) Godf., f. **pinetorum** forma nov. A typo differt habitu robustiore, 50-60 cm. altitudine; floribus numerosioribus; colore saturate viridi, nec flavo-viridi; foliis lanceolatis, flaccidioribus, plano-recurvis, nec plicatis nec undulatis. Caulibus nonnunquam aggregatis. Sub umbra pinetorum crescit, nec in arena aprica. Type in Herb. D. P. Young no. 1636.

This is a tall slender plant, 50-60 cm. high in its most typical form, mid-green in colour with little or no yellowish tinge. The leaves are lanceolate, the middle ones four times as long as broad; less rigid than in the typical form of the sand-dunes, neither plicate nor wavy-edged, but flat and recurved. Raceme long, 13-17 cm., with 20-25 flowers, pale clear green in colour; the hypochile* red-purple within and the epichile† nearly white with a pink flush in the centre (fig. 2). The roots are better developed than in the dune plants, and are more fully described below. Sometimes two or three stems grow in a cluster, which happens more rarely with the dune form. As might be expected, it flowers later than the last-named (end of July and beginning of August). *E. dunensis* f. *pinetorum* is interesting as representing the full stature of the plant under conditions more favourable to growth than the sand-dune habitat of the "typical" form, where growth of all plants is normally stunted and frequently chlorotic.

*Hypochile: the basin-shaped proximal part of the labellum, which in the cross-fertilised spp. contains nectar.

†Epichile: the cordate distal part of the labellum.

The differences between *E. pendula* and typical *E. dunensis* have been sufficiently well pointed out by Thomas (1941) in the original description. *E. pendula* is however very similar in superficial appearance to *E. dunensis* f. *pinetorum*, from which it is difficult to distinguish at a distance, but the specific characters, *viz.*, the pendulous

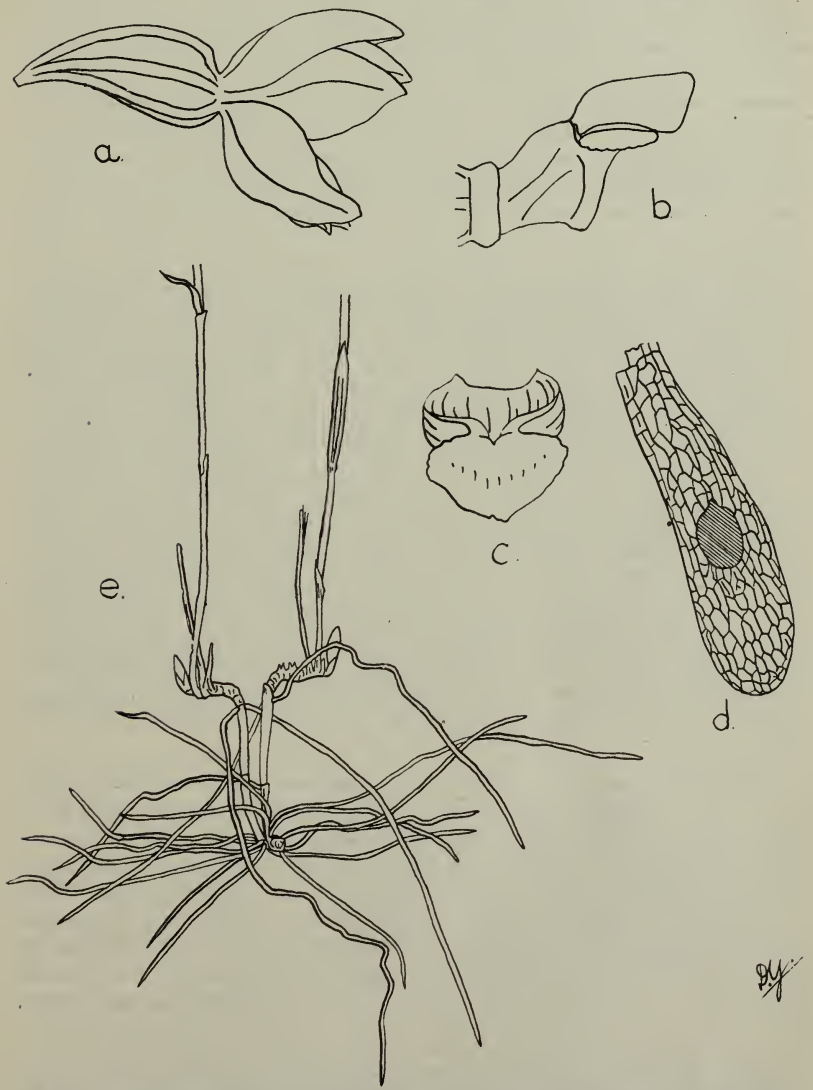

Fig. 2. *Epipactis dunensis* f. *pinetorum*: (*a*) branched rhizome. ×½: (*b*) flower. ×5: (*c*) column, ×10: (*d*) labellum. ×10: (*e*) seed. ×50.

flowers (appearing as if arising from weakness of the peduncles, but actually due to positive geotropism, as the peduncles are fairly rigid) entirely green within (and often without as well), ovate concave leaves of thick texture, and more frequently clustered stems and much stouter roots, will readily separate it. Two further characters may be useful for the determination of herbarium specimens: firstly, *E. pendula* has the upper part (and indeed the whole) of the stem very nearly glabrous, but *E. dunensis*, in common with all *eu-Epipactis* not belonging to the *pendula* group, has a good deal of short pubescence. This character is, however, somewhat variable, and must not be regarded as absolute. Secondly, the leaves of *E. pendula* show a rather characteristic sinuous edge with ciliola in regular groups, whereas other *Epipactis* have a more even fringe—in *E. dunensis* the cilia are so short as to be reduced to papillae, and are scarcely noticeable except under a high power.

Although *E. pendula* often has aggregated stems, they do not by any means always spring from a single rhizome as in *E. purpurata* Sm., but rather resemble the arrangement of *E. Helleborine*. A cluster of seven stems was found to consist of as many separate rhizomes, each bearing one stem and one bud at the base. The whole clump was held together by the interlacing roots, but no physical connection could be traced between the different stems, although one may have existed at an earlier stage of development. A typical root-system (all roots described herein were taken in late September) is shown in fig. 1*a*. The rhizome is variable in length, nearly horizontal or ascending, sending out numerous short and long fleshy roots, white when young, 2.5-3 mm. in diameter. The bud for the next season's growth normally arises at the base of the old stem, but sometimes the underground portion of the stem itself also sends out buds and adventitious roots.* Fig. 1*b* shows an example where a branch stem, ending in a bud and bearing adventitious roots, has arisen 3 cm from the base of the flowering stem, at the fourth node, and another bud has formed at the node immediately below.

The root-system of *E. dunensis* f. *pinetorum* is essentially similar but of very different appearance; the rhizome is shorter and more slender than in *E. pendula*, and the roots, although more numerous than in the type form, are far less numerous than in *E. pendula*, less than half the diameter, wiry, not so straight nor so uniformly descending, but tending to radiate in all directions from the rhizome. It appears that this plant also is capable of budding from the buried portion of the flowering stem, as several examples have been seen of a rhizome sending up a vertical stolon a few cm. long, terminating in another

*This is the normal manner of growth of all British *eu-Epipactis*, varying slightly in detail. Evidence is accumulating, however, that the bud does not necessarily develop during the year immediately following, but may remain dormant for one or several seasons. To this cause may often be attributed the erratic manner of appearance of these plants.

rhizome. This could only have arisen from a bud off the stem, which latter had not decayed but remained as the stolon. For example, fig. 2*a* shows an interesting branched rhizome bearing two stems, which looks as if it had originally branched by the formation of two buds side by side on the original rhizome (visible at the base where the two stolons divide); the following season each of the two resulting stems produced a bud at the second node, which later developed into two horizontal rhizomes connected to the first, the original, by vertical stolons.

Similar roots might be expected with *E. pendula*. If the connecting stolons decayed the result would be a pair or cluster of separate rhizomes. The same result, of course, might arise from germination of several seeds in close proximity, but the rather frequent appearance of such clumps suggests that this is not the explanation. The soil in this station consists of nearly pure sand, covered by a layer about 3 cm. deep of decayed pine-needles. This abnormal underground branching may therefore be the result of the plant's search for humus, and also possibly to efforts to keep pace with the gradual rise in soil level as the layer grows thicker with time. It is hoped to discuss the morphology of the root-systems of various *Epipactis* more fully at a later date.

In the " typical " *E. dunensis* of the open sandhills, the root system, as has been described by Godfery, is much reduced; the rhizome is usually no more than a knob, and sends out very few roots indeed. *E. pendula* also sometimes grows in the open dunes, although it does not seem to have been observed far from trees. This is rather curious, because, as the trees have only been planted in recent times, it raises the question, was *E. pendula* a native of the dunes before they were afforested? In the open this plant, like *E. dunensis*, becomes dwarfed and yellowish, but is then a rather stouter plant than the latter.

The ripe capsule of *E. pendula* retains the pendulous habit and rigidity, modified somewhat by its increased girth, and is pyriform to almost lagenoid in shape. The seeds (fig. 3*d*) are quite different from those of *E. dunensis* (fig. 2*e*; seeds of type and f. *pinetorum* appear to be identical), and more nearly resemble those of *E. Helleborine* or *E. purpurata*. Testa long (1-1.5 mm.), narrow, tapering at each end, cells irregular, elongated; embryo lemon-shaped, rather narrow, opaque.

The foregoing has referred entirely to material from the type-locality. A word may now be said about examples from the few other localities for these two species. The other British station for *E. dunensis*, in Anglesey, is similar to the Lancashire dunes, and the plants there are the same " typical " dunal form. Slight differences from the type have been noted for Continental examples (Meslin, 1928).

E. pendula is also found in Flintshire (v.-c. 51) in an ash-oak wood on carboniferous limestone, and a specimen exists from the Wirral (v.-c. 58). The Flintshire specimens are small but agree closely with the Lancashire plants, except that the anther is, more frequently than in the latter, slightly pedunculate (an approach to *E. vectensis*). There

is thus a compact area of distribution in the north-west, which suggests that the plant may have colonised the coastal plantations from some other source in this area. From the exsiccata and pickled material in Herb. Kew, the plant recorded by Thomas (1941) from the Cotswolds (v.-c. 33) is also a small example of this species. *E. pendula* is further known in Bedfordshire (v.-c. 30), where a distinctly different type occurs in a few small colonies under beech woods on the chalk. Here the plants do not attain the size which they often do in Lancashire, being 20-30 cm. in height and rather slender. The structure of the essential organs agrees well with the northern plants, but the labellum is very small, being about the same size as that of *E. vectensis* although perfectly developed (*cf.* Part II), and as in the latter species it embraces the stigma. The flowers are usually cleistogamic, but the perianth after fertilisation opens and is then extraordinarily persistent, being fresh and green (except for the labellum) when the seeds are being shed (fig. 1c). The seeds are similar to those of the Lancashire plant. Clearly, *E. pendula* is quite catholic as to habitat, and although its original and main station is on the coast its distribution is not markedly maritime. *E. dunensis*, on the other hand, whatever its earlier distribution may have been, is now exclusively coastal so far as is now known.

The reported occurrence of *E. vectensis* in the Lancashire dunes is commented on in Part II.

Brooke, B. J., and Rose, F.; 1940: *J. Bot.*, *78*, 81.
Godfery, M. J.: 1920: *J. Bot.*, *58*, 101.
—— : 1921: *J. Bot.*, *59*, 146.
—— : 1926: *J. Bot.*, *64*, 65.
—— : 1931: *Monograph and Iconograph of the Native British Orchidaceae*, 77.
Meslin, R.: 1928: *J. Bot.*, *66*, 217.
Riddelsdell, H. J., Hedley, G. W., and Price, W. R.: 1948: *Flora of Gloucestershire*, 612.
Stephenson, T., and Stephenson, T. A.: 1918: *J. Bot.*, *56*, 1.
Thomas, C.; 1941: *J. Bot.*, *79*, 200.

II. THE DIFFERENTIATION OF E. PENDULA FROM E. VECTENSIS

As has been shown in Part I, *Epipactis pendula* and *E. dunensis*, although growing together in their main station and superficially alike, are in reality distinct in numerous particulars, and are probably not very closely related at all. *E. vectensis*, on the other hand, is only separated with difficulty from *E. pendula*.

The original Ventnor station of *Epipactis leptochila* Godf. var. *vectensis* T. & T. A. Steph. has most unfortunately been lost. In the circumstances, Brooke and Rose (1940), in raising the Stephensons' plant to the rank of species, described specimens from the colony at Nonington (v.-c. 15), which they considered to be identical with the Isle of Wight plants. The only authentic living material of *E. vectensis* (T. & T. A. Steph.) Brooke & Rose, therefore, is to be obtained from the

Nonington station, and such specimens have here been used as standards of comparison. The question of their absolute identity with the Ventnor plants will be referred to again later.

Although previous descriptions have tended to emphasise that *E. vectensis* is a small and slender plant, this is hardly in fact the case. One plant seen at Nonington was nearly 40 cm. tall; it had 14 flowers. Although it remains to be seen whether *E. vectensis* can attain the very robust stature that *E. pendula* shows in the Lancashire pinewoods, its habit is very similar indeed to the *E. pendula* which grows in beech woods—an entirely comparable habitat—in Bedfordshire. Furthermore, the vegetative portions—stem, leaves, and root—of comparably-sized plants of the two species appear to be completely indistinguishable. So far as can be ascertained, the practical differences lie entirely in the floral structure.

Apart from the characteristic large, shining-glabrous and pendulous ovary, the flowers of *E. pendula* are fairly like those of *E. dunensis*. The perianth more or less resembles that of *E. Helleborine*, apart from being entirely green; the essential organs (fig. 3*b*) are, apart from the lack of rostellum, what might be termed normally shaped, and are similar to those of *E. dunensis* (fig. 2*c*). The stigma is squarish and nearly perpendicular to the floral axis, and the pollinia lie in the clinandrium* in the normal manner, under the anther-cell, which is rectangular in profile and ovate in plan view, and sessile (or, rarely, on a very short filament); the pollinia thus lie behind the stigma. . The mode of fertilisation is a little obscure. The pollen is very scanty, even more so than in *E. dunensis*, and after rupture of the enclosing membrane the pollinium is no more than a little mat of grains inside the clinandrium. It appears that an adequate number of grains work their way to the top edge of the stigma, possibly by gravity, and there germinate.

The floral structure of *E. vectensis*, on the other hand, is distinctly degenerate, as has been observed by Godfery (1931). The perianth segments are narrower than those of *E. pendula*, and the lateral ones are noticeably crooked. They are of the same thick, waxy consistency and green colour as in the latter species, and have the same prominent midribs. The labellum, though, is extremely debased (fig. 4*c*). The hypochile is shallow, dish-like, and the long, acute, white and membraneous epichile is separated from it, not by the usual form of constriction flanked by folds so as to form a central channel, but simply by a latitudinal fold extending almost the width of the lip, and with little sign of a central channel. The hypochile closely embraces the stigma. The flowers do not open widely, and frequently not at all; *E. pendula*, on the other hand, usually opens its flowers normally, and is rarely cleistogamic.

*Clinandrium: the depression on the column, underneath the anther-cell and behind the stigma, in which the pollinia lie.

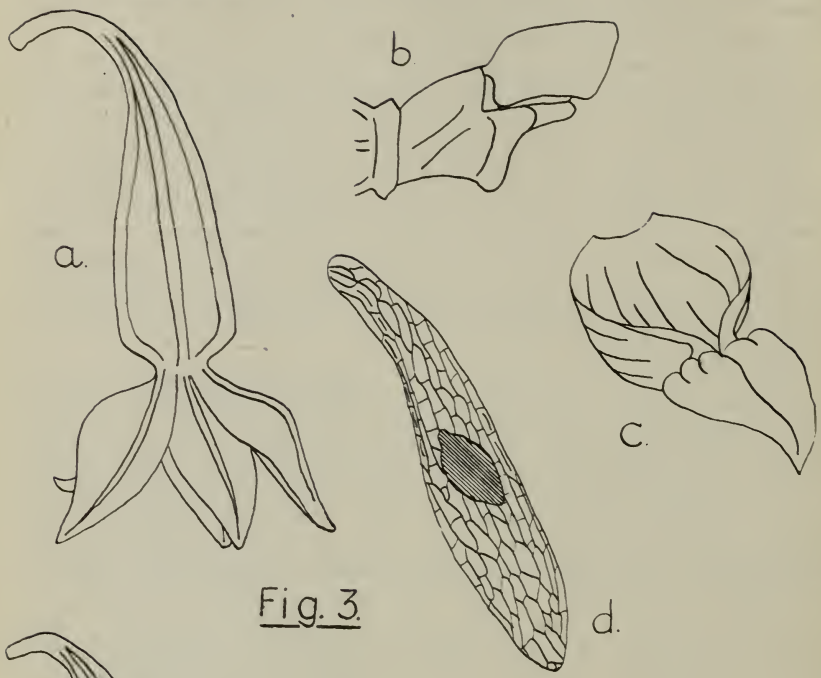

Fig. 3.

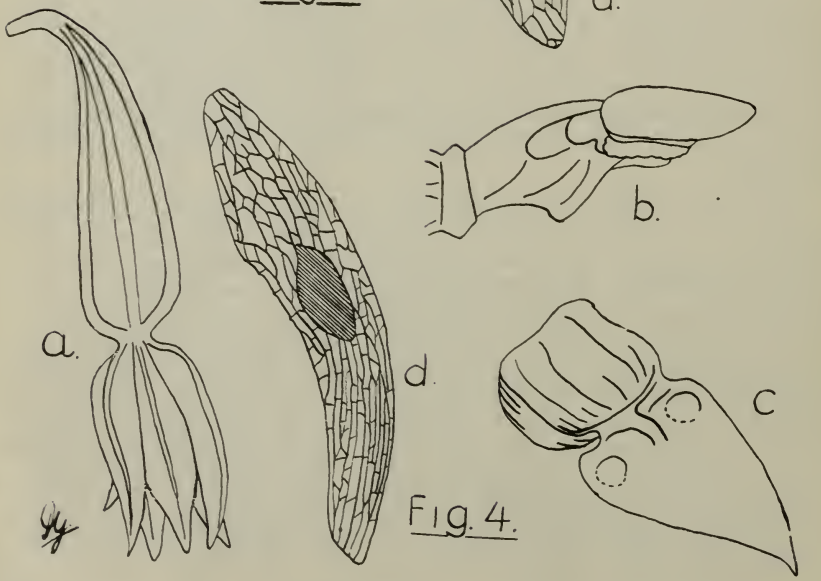

Fig. 4.

Fig. 3. *Epipactis pendula*; Fig. 4. *Epipactis vectensis*: (*a*) flower, ×5; (*b*) column, ×10; (*c*) labellum, ×10; (*d*) seed, ×50.

The structure of the column of *E. vectensis*, however, shows the most remarkable difference from that of *E. pendula*. In the present plant, the column appears elongated and attenuated. The stigma slopes much more steeply backwards, and the long-ovoid, pointed anther-cell, and hence the pollinia, are thrust far forward at the end of a detached filament (fig. 4*b*). The pollinia actually do not lie in the clinandrium, which appears as an empty hollow on either side of the rear of the anther, but instead lie astride, as it were, the horn-like projection which carries the vestiges of the rostellum. They are thus forward of the stigma, and might fertilise it by dropping or sliding back on to it. The very rapid decay of the column, however, lends doubt to whether fertilisation takes place at all, and the plant may well be parthenogenetic; the same remark applies to *E. pendula*. The ovary seems to be a trifle smaller than in *E. pendula*, and although the writer has not had the opportunity of seeing ripe fruit *in situ*, it appears from material and photographs kindly supplied by Messrs Brooke and Rose that the fruit is also rather smaller and more distinctly lagenoid. The seeds closely resemble those of *E. pendula* (fig. 4*d*).

It is clear that *E. pendula* and *E. vectensis* are very closely related, and must have been derived from a common ancestor at a comparatively recent date. The more orthodox floral arrangements of the former species point to it as being the more ancient type. The essential organs of *E. vectensis* bear a remarkable resemblance to those of *E. leptochila*, which has the same stipitate anther-cell and general arrangement. As these two species do not appear to be closely related in other respects—*E. leptochila* lies perhaps nearer *E. dunensis* in the matter of foliage, pubescence, and patent and not pendulous flowers—this must be regarded as an interesting example of parallel development.

The different structure of the column in *E. vectensis*, although in principle only a difference in development, has led to an apparently important distinction in the fertilisation arrangements, which would justify the specific separation of the two. If, as has just been foreshadowed, the plants should be parthenogenetic, this does not affect the argument, as the development of the column has clearly been dictated by the requirements of fertilisation.

Epipactis persica (Soó) Hausskn. ex Nannf. (Soó, 1927), a plant of northern and eastern Europe, also bears a strong resemblance to *E. vectensis* and *E. pendula* in its pendulous flowers and glabrous stem, for instance, but it differs in a most important and interesting respect in possessing a rostellum. Nannfeldt (1946) has placed *E. vectensis* (and also *E. troödi* Lindb. f.) under it as a synonym; however, the presence of a rostellum, quite distinctly stated in the original diagnosis and clearly shown by Swedish specimens (in alcohol) kindly supplied by Dr Nannfeldt, disposes of any question of synonymy. As a matter of fact, the perfect labellum and almost sessile anther-cell make it nearer to *E. pendula*, and its ovary seems to be smaller than either. *E. persica* is, however, of extraordinary interest as being apparently the cross-

fertilised counterpart, and possible progenitor, of the autogamous *vectensis* group.

Judging from exsiccata in Herb. Kew (Cyprus: Lindberg *iter* 1939), *E. troödi* is quite unlike *E. persica*, and could hardly be synonymous, as suggested by Nannfeldt, with the latter, still less with *E. vectensis*.

Other records for *E. vectensis* have mostly not been critically determined with reference to the above criteria, but plants which certainly come under this species occur in Berkshire (v.-c. 22), in a birch-wood on the Bagshot sands. Here the plants are uniformly cleistogamic, the sepals adhering by the tips and persisting so until the seed is ripe. The column and labellum closely resemble those of the Kentish examples, but the former is a trifle less elongated and the anther filament very arched, and the epichile is less acuminate and less papery, green with purplish edges.

As already mentioned, fresh material of the Stephensons' original Isle of Wight plant is no longer available, and the existing descriptions and exsiccata are not really adequate for a critical comparison. However, their description (1918) speaks clearly of long, narrow, acuminate tepals, a shallow hypochile, and of the pollinia overhanging the stigma; the accompanying diagram, although not very clear, suggests that although a filament may be present, the essential organs are not so elongated as in the Nonington plants, although they might more resemble those of the Ascot colony. The specimens in Herb. Mus. Brit. confirm that the tepals are like those of the Kentish plant. On the whole, it may be said provisionally that the Ventnor plant, as compared with the Nonington plant, may have features that approach *E. pendula*—just as, in Bedfordshire, *E. pendula* shows by its small labellum and tendency to cleistogamy and, in Flintshire, by a slightly stipitate anther, features approaching *E. vectensis*.

E. vectensis has also been recorded from the Formby dunes (Travis, 1943), but all the Lancashire material named as *E. vectensis* that I have seen has been a small form of *E. pendula*, and it seems probable that the record was based on such plants. Until it can be confirmed that plants with the characteristics given above do occur in Lancashire, the record must be regarded as doubtful.

Those records which can be assigned to *E. pendula* have already been listed in Part I. Exsiccata of this group are frequently impossible to determine critically, and it is to be urged that specimens should include flowers pickled in alcohol. Pending re-examination of the numerous herbarium records, it may be of interest to give a list of vice-counties for which records, of one sort or another, exist for the *vectensis-pendula* aggregate: 3 (or 4), 10, 11, 12, 13, 15, 17, 22, 29, 30, 33, 41, 51, 58, 59. The apparent continuous geographical variation between the two extremes of the aggregate which might be deduced from the examples given in the present paper, should be regarded with considerable reserve for the moment.

As has been said in Part I, the time is not yet ripe for a reconsideration of the taxonomy of the group. Only study of a much larger number of examples than are at present available can determine whether the *vectensis-pendula* aggregate is to be regarded as a single polymorphic species, or whether it may be divided into recognisable segregates. As matters stand at present, however, it must be stressed that naming of specimens is very critical and must be carried out by meticulous comparison with type-material. Too much emphasis has in the past been placed on relative stoutness or frailty of growth as a distinguishing character. From what has been said here, it is plain that *under comparable conditions* there is little to choose between the stature of *E. dunensis*, *E. pendula*, or *E. vectensis*, or, for that matter, *E. leptochila*. Whilst it is, of course, perfectly correct to describe a plant in the form in which it occurs in its usual habitat, too little attention seems to have been paid to the fact that not only do these, like any other plants, vary very considerably in size between individuals, but also that the characters of different habitats inevitably impress themselves upon the growth of the plants therein.

To sum up, real structural differences exist between *E. dunensis*, *E. pendula*, and *E. vectensis*, and the significance of these may become apparent on closer study and lead to an understanding of their relationships with one another and with other members of the genus. The last two are very closely related, and their further relationship to the (presumably) allogamous *E. persica* indicates that they come from a line of descent that diverged from that leading to *E. leptochila* and *E. dunensis* at a stage before they lost their rostella. Putting this more succinctly: we have evidence that the autogamous *Epipactis* are polyphyletic in origin.

Besides those mentioned in the text, I wish to thank various colleagues, too numerous to name individually, for their kind assistance in field and herbarium work.

Brooke, B. J., and Rose, F.; 1940: *J. Bot.*, *78*, 81.
Godfery, M. J.; 1931: *Monograph and Iconograph of the Native British Orchidaceae*, 74.
Nannfeldt, J. A.; 1946: *Bot. Not. 1946*, (*1*), 1-28.
Soó, R. v.; 1927: *Repert. Spec. nov. Reg. veget.*, *24*, 36.
Stephenson, T., and Stephenson, T. A.; 1918: *J. Bot.*, *56*, 1.
Travis, W. G.; 1943: *N.W. Nat.*, *18*, 326 (see also *B.E.C. 1943-44 Rep.*, 756, 1946).

NOMENCLATURE AND CORRECTIONS TO BRITISH PLANT LIST VI*

By A. J. WILMOTT.

The change in form of the Society's main publication, in which *Plant Notes* or papers will not necessarily appear with this section, will sometimes necessitate the use of names not in accord with the corrected copy of *B.P.L.* When this is inevitable, the significance of such names will be indicated by the citation of the *B.P.L.* number and/or of the *B.P.L.* name in synonymy. Changes accepted will be included in the next Nomenclature section.

" Lam. & DC.," *Flore Française*, 1805-1815. After being cited as " DC." for a century, some purists now write " Lam. & DC." because the title page states that it is ed. 3 of Lamarck's Flora, " by . . . Lamarck et . . . Decandolle." This, according to tradition, is not true. It was purely Decandolle's Flora, and is quite different from the two editions prepared by Lamarck. I have always understood that Lamarck's name at the time was of such importance that his name was added to the title page for sale purposes. There therefore seems to be no reason to-day for departing from the custom of a century, which attributes the new names in it to " DC.", and no justification for citing Lamarck as part author of such names.

21 PAPAVER.

15 *atlanticum* (Ball) Cosson—see *Plant Notes.*

80 RAPHANUS.

1 **Raphanistrum**

e. *violaceus* Woerl.—1885 (" *violaceum* "). See *Plant Notes.*

100 CERASTIUM.

*6(2) **brachypetalum** Pers.—1805: *Syn.*, *1*, 520. This is often cited as Desp. in Pers. or Desp. apud Pers. Desportes, however, was only the collector and should not, therefore, be cited as he was not responsible for either the name or the definition.—See *Plant Notes.*

133 IMPATIENS.

*4 *glandulifera* Royle—1834: *Ill. Bot. Himal.* (plate with analysis of node); 1835: (description)—see Sprague 1933: *Kew Bull.*, 386, for dates of publication. From H. K. Airy Shaw. See *1939/40 Rep.*, 313.

155 TRIFOLIUM.

12 **subterraneum**

b. *oxaloides* (Bunge) Rouy—see *Plant Notes.*

15(2) *elegans* Savi—*vice* 15c.; see *Plant Notes.*

*The five earlier series of *Corrections* appeared in the *B.E.C. Reports*, 1939-47.

190 ALCHEMILLA.—See paper by Walters, pp. 6-18; and *B.E.C. 1946-47 Rep.*

[3 **curtiloba** Buser—Delete.]
[4(2) **heteropoda** Buser—cf. *B.E.C. 1929 Rep.*, 21. Delete.]
4(4) **acutiloba** Opiz.
4(5) **minima** S. M. Walters.
[6 **subcrenata** Buser—Delete.]
[7 **tenuis** Buser—Delete.]
[8(2) **acuminatidens** Buser—see *B.E.C. 1929 Rep.*, 21—Delete.]
[8(3) **controversa** Buser & Jaquet—see *B.E.C. 1929 Rep.*, 21—Delete.]
9 **Wichurae** (Buser) Stefansson.
10(2) **obtusa** Buser.
[11 **reniformis** Buser—Delete.]
[12 **connivens** Buser—Delete.]
[13 **firma** Buser—Delete.]
[14 **Salmoniana** Jaquet—Delete.]
[15 **colorata** Buser—Delete.]
[16 **coriacea** Buser—Delete.]
[17 **crinita** var. **britannica** Jaquet & Druce—Delete.]
18 **conjuncta** Bab.—Vice *A. argentea.*

195 PYRUS.

The subdivision of *Pyrus* into several genera is accepted, but the revised list is not yet ready for publication.

334 PULICARIA.

1 **dysenterica** (L.) Bernh.—1800: *Syst. Verz. Erfurt*, 153. *Inula dysenterica* L., 1753: *Sp. Pl.*, 882.

370 CHRYSANTHEMUM.

17 *coronarium*

a. *concolor* Urv.—1822: *Enum. Pl. Or.*, 112. See *Plant Notes.*

b. *discolor* Urv.—1822: *loc. cit. Vice* var. *bicolor* Druce 1929: *B.E.C. 1928 Rep.*, 618—see *Plant Notes.*

380 PETASITES.

*3 *fragrans* (Vill.) C. Presl.—1826: *Fl. Sic., 1*, xxviii; *Tussilago fragrans* Vill., 1792: *Act. Soc. Hist. Nat. Paris, 1* (1), 72, t. xii.

441 ARCTOSTAPHYLOS.

2 **alpina** (L.) Spreng.—*Arbutus alpina* L., 1753: *Sp. Pl.*, 395.

453 PYROLA.

[3 × 4 **minor** × **secunda** = *Redgrovensis* Druce.

This is represented in Druce's herbarium by a single specimen which is a small plant of *P. minor* and shows no influence of *P. secunda.* The entry should therefore be deleted.—E. F. Warburg.]

480 GENTIANA.

11 *asclepiadea* L.—1753: *Sp. Pl.*, 227.—See *Plant Notes*.

512 *IPOMOEA.*

4 *lacunosa* L.—1753: *Sp. Pl.*, 161.—See *Plant Notes*.

527 VERBASCUM.

1 *phlomoides*

b. *albiflorum* (Rouy) comb. nov.?—*V. phlomoides* subvar. *albiflorum* Rouy, 1909: *Fl. France, 11*, 7.—See *Plant Notes*.

543 VERONICA.

23(2) *austriaca*—see *Plant Notes*.

[A. *dentata* (Schmidt) Watzl.]

B. *Jacquini* (Baumg.) Watzl.

548 RHINANTHUS.

8(3) **Vachellae** Wilmott—see pp. 84-85.

558 **MENTHA.**—See paper by Graham, pp. 88-90.

12 × **Smithiana** R. Graham—*vice* × *M. rubra*.

i. **angustifolia** R. Graham.

600 CHENOPODIUM.

2 **botryodes** Sm.—without initial capital, as originally published.

628 EUPHORBIA.

2 *dulcis*—see *Plant Notes*.

[a. *lasiocarpa* Neilr.—1859: *Fl. Nied.-Oest.*, *2*, 845.]

b. *purpurata* (Thuill.) Koch—1837: *Syn. Fl. Germ.* (part 2), 629. See *Plant Notes*.

703 MUSCARI.

1 **racemosum** (L.) Mill.—1768: *Gard. Dict.*, ed. 8, nr. 3; *Hyacinthus racemosus* L., 1753: *Sp. Pl.*, 318.

PLANT NOTES

Compiled by A. J. Wilmott.

†21/15. **Papaver atlanticum** (Ball) Cosson; *P. rupifragum* Boiss. & Reut. var. *atlanticum* Ball, 1873: in *Journ. Bot., 11,* 296; *P. atlanticum* Cosson, 1882: *Ill. Fl. Atlant., fasc., 1,* 11, t. 6.

21, Middlesex, City of London bombed sites. In the autumn of 1946 I noticed a Poppy growing on rubble in the vicinity of Gresham Street and Aldermanbury with capsules which resembled those of our British *P. dubium.* In May 1947 it was obvious from the unusual colour of the flowers (brick- or orange-red) and the long white hairs on the leaves and lower stem that the plant belonged to an alien species. During the summer it increased considerably and by the autumn it was plentiful on debris over an area of about ¼ mile square about Wood Street and London Wall. My material is a perfect match for that used for *Bot. Mag.,* t. 7107, in Herb. Kew, and differs only in luxuriance from Ball's original specimens. Seed of this rare Moroccan species of the Great Atlas mountains was probably deliberately sown on the bombed sites by a gardening enthusiast but it has shown itself capable of persisting and increasing its area.

This plant is very easily distinguished from the green, subglabrous Spanish *P. rupifragum* by the long hairs on the stem and leaves which give them a greyish appearance. From *P. lateritium* C. Koch, 1855: "*Ind. sem. hort. Berol.*"; Boissier, 1867: *Fl. Orient., 1,* 108, from Armenia, it may be known by the more slender habit, grey instead of yellow hairs on the stem and leaves, smaller and less orange petals, and longer clavate (as compared with stout obovate-clavate) capsules. Spain rather than Morocco should be given in the *British Plant List* (21/12) as the native country of *P. rupifragum.*—J. E. Lousley.

†80/1e. Raphanus Raphanistrum L. var. **violaceus** Woerlein, 1885: *Deutsch. Bot. Monatsschr., 3,* 50; O. E. Schulz, 1919: in Engler, *Pflanzenreich, 4* (*105*), 200, in syn. under var. *purpurascens* Dum., qui est nomen tantum. *R. Raphanistrum* L. ssp. *communis* Domin, var. *typicus* Domin, f. *purpureus* [Rchb.] Domin, 1910: *Beihefte Bot. Centralbl., 26* (*2*), 256. *R. Raphanistrum* L. var. *purpureus* (Domin) Schinz et Keller, 1914: *Fl. der Schweiz,* II Teil (Kritische Flora), ed. 3, 132. *R. Raphanistrum* L. ssp. *segetum* (Baumg.) Clavaud, subvar. *arvensis* (Rchb.) Thell., f. *carneus* Thell., 1918: in Hegi, *Ill. Fl. Mittel-Europa, 4* (*1*), 277.

Petals pinkish-purple, with dark purple veins which show up very distinctly on dried material. Occurs rather rarely in central and southern Europe, and introduced into South America.

21, Middlesex; blitzed site, Ravenscourt Park, London, W.6, 2nd August 1947, N. Y. SANDWITH [Ref. No. 3237]. In addition, this specimen has hispid pods (*R. Raphanistrum* L. forma *hispidus* Lge.). In the same locality there were found specimens with the claw and lower part of the limb of the petals yellow, passing into a curious reddish-brown colour in the upper part of the limb, the veins being dark blackish-purple [N. Y. Sandwith, Ref. No. 3236]. The pods of these specimens were glabrous. This form, for which no name has been traced, may be a cross between var. *violaceus* and var. *ochroleucus* (Stokes) Peterm.—N. Y. SANDWITH.

100/6(2). **Cerastium brachypetalum** Pers. The discovery of this plant by E. Milne-Redhead (1947: *Naturalist, 822*, 95-96) in Bedfordshire adds another species of continental Europe to the British list. A very useful key for the diagnosis of the small-flowered British species of *Cerastium* is appended.—[F. A. Sowter.]

Like *C. viscosum* L., it has completely herbaceous bracts, but they, like the sepals, are exceeded by a pencil of hairs and the whole plant is grey-hairy and generally (not always) densely glandular. It is a rather slender plant distinguished by its long pedicels, which are longer than the fruit. Petals normally much shorter than the sepals. Filaments ciliate (not, as in *C. viscosum*, glabrous). It is one of the species mentioned in 1917 by C. E. Salmon (at the Linnean Society) as likely to occur in the British Isles, although its known station is somewhat suspect.—A. J. WILMOTT.

†155/12b. TRIFOLIUM SUBTERRANEUM L. var. **oxaloides** (Bunge) Rouy, 1899: *Fl. Fr., 5*, 99; Aschers. & Graeb., 1908: *Syn., 6, (2)*, 597; Briquet, 1913: *Prod. Fl. Corse, 2, (1)*, 314. *T. subterraneum* subsp. *T. oxaloides* Bunge ap. Nyman, 1878: *Consp.*, 177.

On June 18, 1947, I was botanising with Dr Cyril West and Mr J. E. Woodhead in a gravel pit at Eaton Socon, Bedfordshire, v.-c. 30, which has become well known in recent years for the interesting aliens it produces. My attention was attracted by a very large unfamiliar clover with stems well over 80 cm. long sprawling over a patch of bare gravel, with petioles up to cm. long, and leaflets up to 2.75 cm. broad by 2.25 cm. long. The plant obviously had the characters of *T. subterraneum* but the large fruiting heads and villous leaves suggested that it must be something more than a colony of giant examples of the native species.

Comparison with herbarium material and descriptions of var. *longipes* H. Gay showed that the characters were much more extreme than in that variety and although authentic material of var. *oxaloides* is not available there can be no doubt that the Eaton Socon plant should be so referred. The var. *oxaloides* appears to be a rare Mediterranean variety distributed from as far apart as Constantinople and Portugal but material grown at Aberystwyth in 1920 from seed believed to have come from Australia (Hb. Kew) is identical. It seems that *T. sub-*

terraneum is grown as a crop in Australia and clearly only a large variety such as this would be suitable. The plant has been known to have been introduced into this country in wool (Hayward & Druce, 1919: *Adventive Fl. Tweedside*, 60) and as other Australasian wool aliens are recorded from Eaton Socon this is likely to have been the origin of the present plants.

Mr E. Milne-Redhead collected young and less representative material of the same variety from the gravel pit on May 5, 1946 (Hb. Kew) so that it persisted for at least two years. I have collected specimens which approach it in Scilly (Abbey Grounds, Tresco, 1938, *Exsicc. Isles of Scilly*, No. 113, Hb. Lousley) and J. W. White had similar intermediate specimens from Jersey (Churchyard, St Brelades, 1897, *Hb. Kew*). As Ascherson & Graebner suggest, *T. subterraneum* var. *oxaloides* is a remarkable plant which deserves further observation.—J. E. Lousley.

†155/15(2). **Trifolium elegans** Savi. 1798: *Fl. Pisana*, *2*, 161. tab. 1, fig. 2; 1810: *Observ. Trifol.*, 92.

16, W. Kent, Green Street Green near Orpington. On July 5, 1947, I was botanising with Mr J. E. Woodhead in a pit filled in with rubbish where many interesting aliens had been found in the past, when a clover with bright rose-coloured flowers attracted our attention. Comparison with Savi's description and illustration and with ample material from the Mediterranean region at Kew showed that it was *T. elegans*. The sprawling habit, smaller, rounder and more obtuse leaves, and smaller flower-heads (c. 2 cm. across as compared with c. 2½ cm.) distinguish this species from the Alsike Clover, *T. hybridum* L. *s. str.* (="*T. fistulosum* Gilib.," *Fl. Lithuan.*, 46, 1785, *nomen abortivum*), generally grown in Britain. Although connected by many intermediate forms, the two plants are characteristic of different geographical areas and are probably best treated as species, or at least as subspecies as is done in most recent continental works. They have been much confused and, for example, the accounts given by Rouy (1899: *Fl. France*, *5*, 81-82) and Ascherson & Graebner (1907: *Syn. Mitteleur. Fl. 6* (*2*), 495-496) are misleading. Those of Koch (1857: *Syn. Fl. Germ.*, ed. 2, 151-152), Hegi (1924: *Ill. Fl. Mitteleur*, *4* (*3*), 1299-1302) and Jansen & Wachter (1924: *Ned. Kruidk. Arch.*, *1923*, 217-226) are much more reliable. The following specimens in Herb. Kew represent *T. elegans* Savi: Schultz, *Herb. norm.*, *cent. 3*, No. 244; Schultz, *Fl. Gall. & Germ.*, *cent. 2*, No. 23 (cited by Koch); Michalet, *Pl. Jura*, *fasc. 1*, No. 11; Van Heurck & Martinis, *P. . . . Belg.*, *fasc. 7*, No. 315; Fiori & Beguinot, *Fl. Ital.*, *3*, No. 2464. Material distributed by C. E. Britton as *T. elegans* is *T. hybridum*.—J. E. Lousley.

†365/4. Achillea ligustica All. 41, Glamorgan; waste ground, Barry Dock, July 13, 1924, R. Melville; *ibid.*, August 1930, G. C. Druce. Each of these gatherings was distributed through the Exchange Club under the name *Achillea nobilis* L., see *B.E.C. 1924 Rep.*, 726

(1925), and *1930 Rep.*, 516 (1931), and no alternative name was submitted; while *A. nobilis* was retained as the name for this plant in the *Adventive Flora of the Port of Cardiff* and its second supplement (*B.E.C. 1925 Rep.*, 1016 (1926); *1938 Rep.*, 79 (1939)), the latter referring to a Cardiff, not to a Barry, plant). *A. ligustica* All., with which the Barry specimens are evidently to be identified, is distinguished from *A. nobilis* by the much larger, less crowded, ultimate segments of the leaves, which tend to be bi- instead of tri-pinnatisect; while its lower leaves have 5-6 (instead of 8-15) pairs of primary segments which are divided into distinct, linear-lanceolate, sometimes divided laciniae. The involucral bracts have no brown colouring on the margins, but this is of doubtful value as a diagnostic character. *A. ligustica* has a more southern and Mediterranean distribution than *A. nobilis*. The Bristol plants identified as the latter species, as well as those from Par, Cornwall, prove to be correctly named. The Barry specimens at Kew were first referred to *A. ligustica* by the late Mr A. R. Horwood.—N. Y. SANDWITH.

†370/17b. CHRYSANTHEMUM CORONARIUM L. var. **discolor** Urville, 1822: *Enum. Pl. Or.*, 112. 6, N. Somerset; tip at Ashton Gate, Bristol, June 1939, Mrs C. I. SANDWITH; rays creamy white. This variety is characterised by its white rays and golden disk. It occurs throughout the Mediterranean Region with the typical, and commoner, form with golden rays and disk, var. *concolor* Urv., *loc. cit.*—N. Y. SANDWITH.

†480/11. **Gentiana asclepiadea** L. A handsome Gentian frequently grown in gardens now semi-naturalised in Sussex (see *Plant Records*). It is a tall (30-100 cm.) plant of woods and wet meadows in central and southern Europe, also in the Carpathians. The large flowers occur singly in each axil of the upper pairs of rather distant ovate-lanceolate attenuate leaves. The corolla is cuneate-campanulate, longish, deep bright blue (or white) with glabrous throat.—A. J. WILMOTT.

†512/4. **Ipomoea lacunosa** L. A sparingly hirsute annual with long slender twining stems and entire leaves; 1-3 flowered, sepals nearly glabrous, ovate, 10-12 mm. Corolla 1.5-2 cm. long, tube white, funnel-shaped. Capsules subglobose, over 1 cm. in diameter. Native of U.S.A., Pennsylvania to Kansas, South Carolina and Texas. 21, Middx.; under the wall of Soya Foods Ltd., Springwell, north of Harefield, 1947. —D. H. KENT.

†527/1b. VERBASCUM PHLOMOIDES L. var. **albiflorum** (Rouy) Wilmott differs in its white corolla. 21, Middx.; rubbish tip, Northolt, with the typical plant, 1947.—D. H. KENT.

†543/23(2)B. VERONICA AUSTRIACA L. subsp. **Jacquini** (Baumgarten) Watzl, 1910: *Abh. zool.-bot. Ges. Wien*, *5*, 5, 63; *V. Jacquini* Baumgarten, 1816: *Enum. Stirp. Trans.*, *1*, 26, based on Jacquin, 1776: *Fl.*

Austr., *4*, 15-16, t. 329; *V. austriaca* L. proles *Jacquini* Maly, 1908: *Magy. bot. Lap.*, 229. Native of N. Italy, Austria, Hungary, Galicia, the Balkans, Mid.- and S.-Russia, Caucasus and Asia Minor. Leaves sessile, pinnate with linear divisions; those of the terminal shoots less deeply divided or sometimes entire. (The more northerly subsp. *dentata* (Schmidt) Watzl has leaves shortly stalked, oblong to linear-lanceolate and more or less toothed, those of the terminal shoots being narrower and usually entire). 21, Middx.; tip near Ruislip, September 1947.—Mrs Moody per Miss C. M. Rob. Det. & comm. J. E Lousley.

[It is not known to which subsp. earlier records belong. Specimens should be sent for determination.—A.J.W.]

†628/2. Euphorbia dulcis L. All the British specimens examined by me have glabrous and warty capsules, and therefore come under var. *purpurata* (Thuill.) Koch, 1837: *Syn. Fl. Germ. et Helvet.*, 628: Rouy, 1910: *Fl. France*, *12*, 152. This is the common form of the species in Western Europe. The typical, and Linnean, form of the species is var. *lasiocarpa* Neilr., 1859 (var. *typica* Beck, 1892), with hairy and warty capsules, which is most usually met with in East and North Central Europe; see Kerner, 1882: *Sched. ad Fl. Exsicc. Austr.-Hung.*, *2*. 44-45, No. 495). *E. purpurata* Thuill. was maintained as a distinct species by Kerner, *l.c.*, pp. 45-46, No. 496, but not by later writers of standard works, such as Rouy, Fiori, Hegi and Hayek. Hegi (*5* (*1*), 155) gives var. *incompta* Cesati as the name for the glabrous-fruited plant, but Cesati (1838: *Bibl. Ital.*, *91*, 348; see *Linnaea*, *13*, 88 (1839) and the *Index Kewensis*) published his name as a species, and in any case his name is later than Koch's reduction of *E. purpurata* Thuill. to varietal rank.—N. Y. Sandwith.

637/1j. Urtica dioica L. var. subinermis Uechtr. 17, Surrey; Bookham Common, with the normal stinging form, 1947, D. Macer-Wright. Uechtritz (1863: *Verh. bot. Ver. Brandenb.*, *5*, 146) says (transl.): "mostly quite without stinging hairs," but adds: "upper leaves both narrower and less distinctly cordate-based." As one would now presume, there is no correlation between the two variations. At Bookham the stinging and non-stinging plants look otherwise identical, both are broad leaved. At Wicken Fen (29. Cambs.) the non-stinging plants are "var. *angustifolia* Wimm. & Grab." The epithet *subinermis* is not as inappropriate as it may at first appear, for it is not that the compound "urticoid" hairs will not sting but that they are nearly absent; if trouble is taken to test the one or two scattered compound hairs that can be found, they can be made to give a slight prick, but whether as pungently as a single one of the normal form is difficult to judge.—Det. & comm. A. J. Wilmott.

650/10(2). Salix cinerea L. The points of distinction between this species and *S. atrocinerea* Brot. have been set out in a paper by Guinier (1911: Un Saule peu connu de la Flore de France (*Salix atro-*

cinerea Brot.); *Bull. Soc. bot. France, 58,* ix-xxi). He describes *Salix cinerea* as a very densely branching globular bush, the branches coming from the base of the plant in the open although in shade the stem is often bare at the base; the branches are suberect, sinuous, and normally not elongated, pubescent with short dense greyish hairs (like velvet) when young, the hairs persisting all the first year and part of the second, so that the plant is recognisable from a distance by its habit and ashy grey colouring. The buds are densely greyish tomentose. Leaves rarely entire, usually undulate or even erose-dentate; upper surface pubescent with short rather scarce but persistent hairs, dark matt green more or less ashy; underside strongly velvety tomentose, ashy from the long whitish uniformly spread hairs. Flowers in the catkins opening basipetally. Pedicels 3-5 times the length of the nectaries. A plant of wet (damp) places—watersides, ditches, marshes, and damp meadows, never in ordinary open places and rarely in woods (then near rivers).

S. atrocinerea Brot. is described as a taller plant with irregular branching, foliage dark green showing some greyish tones. Branches glabrous when fully developed, at first with more feeble pubescence of short much fewer hairs which do not mask the colour of the shoot, the young branches being brown; the hairs are often easily caducous and the branches often glabrous in the middle of the vegetative season, though near the sea pubescence may persist into the second year. Buds with rare and caducous pubescence, glabrous and shining in winter. Leaves usually entire, only slightly undulate and very rarely erose, with very fine (scarcely visible) teeth; upper surface with a few hairs at first, rapidly glabrous, deep shining green; underside with abundant waxy covering, the hairs short, easily caducous especially on the nerves, reddish when old, wherefore the colour is glaucous more or less flecked with red, from which the nerves stand out by their fawn colour. Flowers opening basifugally. Pedicels of female flowers about $\frac{1}{3}$-$\frac{1}{2}$ the nectaries, which are longer. The plant is less exacting in its water requirements; it will grow in wet (damp) places, but also grows in places which are not humid—hedges, ordinary meadows, forests—so long as the soil is siliceous or granitic: on calcareous soils it is confined to near water.

Both species have long striae under the bark.

I do not feel sure how far this description of *S. atrocinerea* is correct for British material. In the British Isles it is very variable, and the characters given by Guinier should be tested in the field. Guinier records *S. cinerea* for Britain—"Yorks: Herb. Fac. de Science de Nancy." J. E. Little thought that he had it from Herts. Otherwise the first British record was made on the Bedford excursion (1947), and Dr E. F. Warburg independently collected it on Wicken Fen (Cambs.), verifying his opinion with me this year by comparison with European specimens in *Herb. Mus. Brit.*—A. J. WILMOTT.

OBITUARIES

Compiled by J. E. Lousley.

Albert Bruce Jackson (1876-1947). By the death of Mr A. Bruce Jackson at his home at Kew on 14th January 1947 the Society has been deprived of the help of one of its oldest and most respected members. He contributed to the exchange as long ago as 1895 and when he passed away he was the last survivor of the 28 botanists who sent parcels in that year. His interest in this part of our activities was maintained until the end of his life not only as a regular contributor of material but also as distributor and referee.

Bruce Jackson was born at Newbury, Berkshire, on 14th February 1876 and was first employed as a journalist on the *Newbury Express* and later in Leicester. Records of the plants he found during this period will be found in Druce's *Flora of Berkshire*, 1897; Horwood and Gainsborough's *Flora of Leicestershire and Rutland*, 1933; *Transactions of the Leicester Literary and Philosophical Society*, 1900, 1901, 1902 and 1904; *Journal of Botany*, 1904 and 1906; and *Annals of Scottish Natural History*, 1907.

In February 1907 he obtained a post as temporary technical assistant in the Herbarium at Kew, which he left soon afterwards to assist Elwes and Henry in the preparation of their great book *The Trees of Great Britain and Ireland*. From this time dated an interest in arboriculture which was destined to inspire his main botanical work. In 1910 he was appointed a technical assistant at the Imperial Institute where he served for 22 years. In the remaining years of his life he was employed in the Department of Botany, British Museum (Natural History).

Most of his publications were concerned with trees. He collaborated with W. Dallimore in *A Handbook of Coniferae*, and with H. Clinton Baker in the third volume of *Illustrations of New Conifers*. He acted as consulting arboriculturalist to a number of estates and published accounts of the collections at Syon House (1910), Yattenden Court (1911), Albury Park (1913), Westonbirt (1927), and Borde Hill (1935). Although he was in directive charge of the trees and shrubs at Woburn for over 20 years no catalogue of this important collection was published. In recent years he revised (and in parts almost rewrote) some of Step's books in the "Wayside and Woodland" series and took an immense amount of trouble to try to bring them up to date.

Apart from the importance of his wide knowledge of trees and shrubs to British field botanists he will be remembered as an authority on *Thymus* and *Barbarea*, on which he wrote several papers. Jackson's work on these groups was characteristic of the man—moderate and sensible. Alleged differences in which he had no real faith were never accepted. His account of *Doronicum plantagineum* var. *Willdenowii* (1936: *Journ. Bot.*, *74*, 140-2) resulted from his careful checking of a plant I showed him in Essex under a name which had been accepted since 1800.

His services to botany were recognised in his election as an Associate of the Linnean Society in 1917 and the award of the Veitch Memorial Medal of the Royal Horticultural Society in 1925. He served on the Scientific Committee of the last mentioned Society.

The outstanding quality of Bruce Jackson was quickness—in speech, in actions, and in work. He was overflowing with enthusiasm and his enthusiasm was infectious. His capacity for work was immense and he was always busy. Never idle for a moment and moving about at a speed which would shame many a younger man, he achieved a great deal more in life than might be supposed from a catalogue of his publications. Much of his time was spent in helping others and in tasks which received little or no publicity. Those who had the advantage of his acquaintance have been deprived of a cheery and ever helpful friend.

He had a large and well prepared collection of flowering plants and ferns which he left to the British Museum (Natural History) and an excellent collection of bryophytes which is now at the South London Botanical Institute. His books, many of which were annotated, have been sold through a London bookseller. He left a widow and three sons.

J. E. LOUSLEY.

(Other notices will be found in *The Times* for January 16, 1947; *Proc. Linn. Soc., 158*, 132 (1947); *Gardener's Chronicle, 121*, 46 (1947); and *Nature, 159*, 156 (1947). J.E.L.)

HERBERT WILLIAM PUGSLEY (1868-1947). With the death of H. W. Pugsley has passed the last of a generation of keen amateur botanists, who kept alive the interest in and study of our native flowering plants during the period of its greatest neglect by those whose duty it should have been to foster such studies, those in charge of botanical departments at our universities. Because of this neglect the knowledge of our own vascular plants has lagged behind the progress of our continental neighbours, and is only now beginning to make up the leeway. But Pugsley more than any of his British contemporaries had a field knowledge of plants on the European continent, which he utilised in the elucidation of those groups in our own flora which he made his special interest.

He was in origin a west-country man, born in Bristol on 24th January 1868, and retaining a special interest in his native city through his delight in the work of the Bristol School of water-colour artists, whose drawings formed the nucleus of his extensive collection of such drawings by British artists, the accumulation of which was one of his major interests. He was educated at Bristol Grammar School and came to London at the age of seventeen to study under a coach for the Civil Service. He entered the department of Accountant General of the Navy in 1886, remaining in it until he retired in 1928. In 1889 he obtained his London B.A. by private study. For more than half a century he lived in the same house at Wimbledon, and his early botanical papers show his interest in the local flora.

As the list of his published papers shows, he developed a wide and sound knowledge of the British Flora as a whole; probably the widest of any of his generation. This knowledge was always at the service of others, as many would testify. When E. S. Marshall died in 1919 he took his place as one of the Referees for the Watson Botanical Exchange Club, and remained so until that Club came to an end.

He spent a considerable amount of his vacation abroad, and had a very good knowledge of the Swiss flora. Mostly he went alone, but once he went with H. N. Dixon, and on a visit to Algeria to study *Rupicapnos* in the field he went with E. G. Baker and C. Norman.

His critical mind was naturally attracted to the study of difficult groups, and it is hard to say which of his special interests—*Fumaria*, *Narcissus*, *Euphrasia*, or *Hieracium*—occupied pride of place. That which blossomed first was *Fumaria*; his second publication was an account of the British Capreolate Fumitories in 1902, when he described new endemic species which have stood the test of time. A Monograph of this genus appeared in 1919, followed by Supplements necessitated by the advances in knowledge which resulted from the study of material sent to him as the acknowledged expert. His knowledge of this genus was profound: one glance at a specimen was often sufficient for him to reach a determination which closer investigation left unshaken.

But if of *Fumaria* he had the best knowledge, it was for the *Narcissi*, I think, that he had the greatest love. In his small garden he grew an astonishing number of them, as well as a number of *Hieracia* and other interesting or critical species. He was disappointed that the finer species of Fumitory would only develop untypical depauperate forms in cultivation, and he concentrated on his *Narcissi*, publishing monographs of two sections of the genus—Poet's Narcissi in 1915 and section *Ajax* in 1933.

Having mastered and dealt with *Fumaria*, he began to concentrate on *Euphrasia*, material of which he had been collecting for many years, not only in the field but also through continental Tauschverein agencies. This led to a Monograph of the British forms in 1930, followed, as in *Fumaria*, by supplementary notes resulting from his inundation by specimens sent to him for determination. He several times complained—mildly—to me that he wrote the Monograph so that others could name their own specimens, instead of which they sent them to him to name. For the preparation of that Monograph caused him great trouble with his eyes for some time. His eyesight was of very short focus; but possibly many of those who have seen him remove his glasses and peer at Eyebrights—or Fumitory fruits—from very short range did not realise that sight from such short distance had an effect that others gain only by the use of a lens. He told me that before he finished the MS. of his *Euphrasia* monograph he examined over 10,000 specimens four times—in his first study, again in preparing his MS., which was done in pencil with many erasions and insertions, again before he made his fair copy, which was in small neat characteristic script,

and yet again before he was willing to send the MS. for publication. This meticulous method of study was characteristic of all his work, and was the basis of his soundness. But his eyes suffered terribly and for a time he was fearful of losing his sight or of having damaged his eyes permanently. Happily this fear did not materialise, but for a considerable time it made him unwilling to examine any more Eyebrights.

Having dealt with *Euphrasia* he set about *Hieracium*, a much more serious proposition. As with *Euphrasia*, he had been accumulating material of the genus for a long time. And of the British *Hieracia* he completed his MS. of a monograph during the last war. After the war his difficulty was to arrange for its printing, for it would run to about 600 octavo pages. Happily this difficulty was surmounted, and before he died he had prepared drawings to illustrate the sections and saw all but the last galleys in print, though he was not to see this—his *magnum opus*—completed.

He described new species and varieties in many of our critical genera—*Limonium*, *Gentiana* (series *Amarellae*), *Orchis*, *Orobanche*, *Mentha*—and the appended list of his publications shows how widely his critical eye ranged. If I had to give a general critique of his work, I would say that I was able to agree so far as his species were concerned, but when it came to his varieties I was less happy and did not always feel that the material I examined supported his views. He did not completely keep up with changes in the International Rules of Botanical Nomenclature, and here his work is sometimes not sound: but nomenclature is well known to be a battle-ground of individual opinions. The accurate discrimination of the species themselves is the more important task and it is probable that most of his species will stand the test of time.

He was not only a botanist; he was one of the older school of naturalists. He had a considerable knowledge and collection of Lepidoptera although he only published one note on this subject, in 1923. He also had considerable talent in drawing and most of the illustrations of his papers were prepared by himself. Those for his *Hieracium* monograph occupied a great deal of his time last summer and caused him considerable trouble over their reproduction owing to his use of diluted Indian Ink, which made the task of the photographer more difficult. The same difficulty occurred with the drawings of E. W. Hunnybun, which can only be appreciated in the originals.

He was keenly interested in the protection of wild plants, and prepared the majority of the county schedules of species for which the C.P.R.E. sought protection by bye-law. The extermination of a rare Pyrenean *Narcissus* for sale to gardeners, although it was known to die out regularly in our gardens, and consequently had a good market value, equally excited his condemnation. Too many gardeners seem to consider that rapacity abroad is less objectionable than at home, but Pugsley certainly had no such parochial view. His own collecting was if anything rather on the meagre side for work on critical groups. But

he appreciated good specimens and was much annoyed when his own Fumitories were spoiled by bad mounting, which sometimes happened because the flowers are so easily removed by brushing.

As a man he was quiet, expressing himself better in writing than in speech, meticulously careful and correspondingly somewhat cautious, with a justified pride in his work, kindly though critical, something of a *bon viveur* and full of anecdote. He did not seek the limelight, but was helpful in committee. If his work was challenged or his manuscript interfered with he showed himself capable of defending his position effectively.

He died on 18th November 1947, leaving a widow and three sons, three other sons having predeceased him. The bulk of his herbarium is bequeathed to the British Museum.

The following list of his publications has been prepared from his own rough list. [s.n.]=short note.

1900 : *Ranunculus Baudotii* Godr. [at Wimbledon]; *J.B.*, *38*, 23-24. [s.n.]
1902 : The British Capreolate Fumitories: *J.B.*, *40*, 129-136, 173-181, t. 436.
1903 : *The Nineteenth Annual Report of the Watson Botanical Exchange Club*, 1902-3 [pp. 17].
1904 : A new *Fumaria*; *J.B.*, *42*, 217-220, t. 462.
: List of the Flowering Plants and Vascular Cryptogams recorded for Wimbledon: *Wimbledon and Merton Annual*, *3*, 150-159.
1906 : Notes on Cornish Plants; *J.B.*, *44*, 231-233.
: Bristol Plants; *J.B.*, *44*, 395. [s.n.]
: Cardigan Plants; *J.B.*, *44*, 395. [s.n.]
1908 : The Forms of *Salvia Verbenaca*; *J.B.*, *46*, 97-106, 141-151, t. 489 B.
1909 : *Salvia horminoides* Pourret: *J.B.*, *47*, 89-91.
1910 : *Fumaria occidentalis*; *J.B.*, *48*, 58. [s.n.]
: *Mentha alopecuroides* Hull; *J.B.*, *48*, 285. [s.n.]
: Additions to the List of Flowering Plants and Vascular Cryptogams recorded for Wimbledon: *Wimbledon and Merton Annual*, *4*, 179-186.
1911 : Lyme Regis Plants; *J.B.*, *49*, 365.
1912 : Dorset Plants; *J.B.*, *50*, 65-66. [s.n.]
: Isle of Wight Plants: *J.B.*, *50*, 378. [s.n.]
: The Genus *Fumaria* in Britain: *J.B.*, *50*, *Suppl. I*, 1-76, t. 519.
1913 : British *Fumaria* Records; *J.B.*, *51*, 50-51.
: Isle of Wight Plants; *J.B.*, *51*, 335-336. [s.n.]
1914 : Dorset Plants: *J.B.*, *52*, 40-41.
: Notes on Channel Islands Plants: *J.B.*, *52*, 327-332.
1915 : British Forms of *Hypericum humifusum* and *H. linarifolium*; *J.B.*, *53*, 162-170.
: *Narcissus poeticus* and its Allies: *J.B.*, *53*, *Suppl. II*, 1-44, 2 pls.
1916 : *Convolvulus arvensis* [with double flowers]; *J.B.*, *54*, 88. [s.n.]
1917 : Surrey Helleborines; *J.B.*, *55*, 352. [s.n.]
1919 : A Revision of the Genera *Fumaria* and *Rupicapnos*; *J. Linn. Soc., Bot.*, *44*, 233-335, pls. 9-16. [H.W.P. *del.*]
: Notes on British Euphrasias. I: *J.B.*, *57*, 169-175.
1920 : *Fumaria*; in Moss, *The Cambridge British Flora*, *3*, 171-190.
: *Plantago alpina* and *P. maritima*: *J.B.*, *58*, 149-150.
: Notes on British Hawkweeds: *J.B.*, *58*, 281-285.
1921 : On *Hieracium aurantiacum* L.: *J.B.*, *59*, 60-69.
: A mountain Form of *Carex pulicaris*: *J.B.*, *59*, 106-109, 301. [s.n.]
: *Spergularia marginata* var. *glandulosa* Druce; *J.B.*, *59*, 130-131.
: The Jersey *Herniaria*; *J.B.*, *59*, 179-180. [s.n.]
: British Forms of *Jasione montana* L.; *J.B.*, *59*, 209-216.

1922 : Notes on British Euphrasias, II; *J.B.*, *60*, 1-5.
: *Hieracium pulmonarioides* Villars; *J.B.*, *60*, 55-56. [s.n.]
: A spineless Variety of *Genista anglica*; *J.B.*, *60*, 201-203.
: *Ophioglossum vulgatum* L.; *J.B.*, *60*, 301. [s.n.]
1923 : Note on *Dryas paphia*; *Entomologist*, *56*, 14-15.
: Notes on Carnarvonshire Plants; *J.B.*, *61*, 19-23.
: A new British *Calamintha*; *J.B.*, *61*, 185-191, with text plate. [H.W.P. *del.*]
1924 : *Rumex elongatus* × *obtusifolius*; *J.B.*, *62*, 55. [s.n.]
: *Crocus vernus* All. in Surrey; *J.B.*, *62*, 82-83. [s.n.]
: Notes on Pembrokeshire Plants; *J.B.*, *62*, 102-105.
: A new Statice in Britain; *J.B.*, *62*, 129-134, with text plate. [H.W.P. *del.*]
: *Gentiana uliginosa* Willd. in Britain; *J.B.*, *62*, 193-196.
: *Limonium transwallianum*, nom. nov.; *J.B.*, *62*, 277. [s.n.]
: *Fumaria muralis* Sond. var. *cornubiensis* Pugsley (nov. var. ined.); *Wats. B.E.C. 1923-24 Report*, 246.
1925 : *Mentha rubra* Sm.—A Correction; *J.B.*, *63*, 86. [s.n.]
: [*The London Catalogue* : Eleventh Edition] The Genus *Hieracium*; *J.B.*, *63*, 302-304. [rev.]
1926 : The British *Orobanche* List; *J.B.*, *64*, 16-19.
: *Saxifraga umbrosa* L. var. *genuina* Syme; *J.B.*, *64*, 19-20, ex *Wats. B.E.C. Report*.
: John Cryer; *J.B.*, *64*, 220. [obit.]
1927 : The Nomenclature of the Group *Salvia Verbenaca* L.: *J.B.*, *65*, 185-195.
: *Primula* hybrids; *J.B.*, *65*, 351. [s.n.]
: Further Notes on the Genera *Fumaria* and *Rupicapnos*; *J. Linn. Soc., Bot.*, *47*, 427-469, pls. 15-17. [H.W.P. *del.*]
1928 : The Longevity of Seeds; *J.B.*, *66*, 203-204.
: An overlooked Fumitory from the Canary Islands; *J.B.*, *66*, 298-299.
1929 : New British Species of *Euphrasia*; *J.B.*, *67*, 224-225.
1930 : Plants of North Cornwall; *J.B.*, *68*, 88-89. [s.n.]
: The Duration of *Herniaria glabra*; *J.B.*, *68*, 214-218.
: *Limonium transwallianum* Pugsl. in Ireland; *J.B.*, *68*, 316. [s.n.]
: *Juncus alpinus* Villars in England; *J.B.*, *68*, 368-370.
: A Revision of the British Euphrasiae; *J. Linn. Soc., Bot.*, *48*, 467-543, pls. 26-37.
1931 : A further new *Limonium* in Britain; *J.B.*, *69*, 44.
: The Forms of *Symphytum tuberosum* L.; *J.B.*, *69*, 89-97.
: *Narcissus hellenicus* Pugsl.; *J.B.*, *69*, 195-196.
: A new *Juncus* in Scotland; *J.B.*, *69*, 278-284, with text plate. [H.W.P. *del.*]
: Botanical Exchange Club Reports; *J.B.*, *69*, 288-291. [rev.]
1932 : Edward Step; *J.B.*, *70*, 18-19. [obit.]
: *Limonium paradoxum*; *J.B.*, *70*, 81-82. [s.n.]
: George Claridge Druce; *J.B.*, *70*, 141-144. [obit.]
: Devonshire Association [Report]; *J.B.*, *70*, 172. [abstract]
: [Philippine] *Euphrasia*: *J.B.*, *70*, 172. [rev.]
: Notes on *Euphrasia*; *J.B.*, *70*, 200-204.
: *Comital Flora of the British Isles*, Druce; *J.B.*, *70*, 208-210. [rev.]
: *Euphrasia Schinzii*; *J.B.*, *70*, 262. [s.n.]
: Botanical Exchange Club Reports; *J.B.*, *70*, 342-344. [rev.]
: Further Notes on the Genera *Fumaria* and *Rupicapnos*, II; *J. Linn. Soc., Bot.*, *49*, 93-113, pl. 19. [H.W.P. *del.*]
1933 : A Monograph of *Narcissus*, subgenus *Ajax*; *J.R. Hort. Soc.*, *58*, 17-93.
: Notes on British *Euphrasia*, III; *J.B.*, *71*, 83-90.
: *Artemisia Stelleriana* Besser; *J.B.*, *71*, 107. [s.n.]
: James Groves; *J.B.*, *71*, 136-139. [obit. with portr.]
: Taxonomical Remarks on *Juncus alpinus* Villars and some related Species. —Lindquist; *J.B.*, *71*, 167-168. [rev. with comments]
: Euphrasias of Iceland and the Faroes; *J.B.*, *71*, 303-309.
: Eric Drabble; *J.B.*, *71*, 318-319. [obit.]
: [Botanical Exchange Club Reports]; *J.B.*, *71*, 354-356. [rev.]

1934 : Irish Forms of *Neotinea intacta* Rchb. f.; *J.B.*, *72*, 54-55.
: *Sorbus porrigens* Hedlund in Ireland; *J.B.*, *72*, 58.
: Flora of Lundy Island; *J.B.*, *72*, 58-59.
: Further Notes on the Genera *Fumaria* and *Rupicapnos*, III; *J. Linn. Soc., Bot.*, *49*, 517-528, pl. 30. [H.W.P. *del.*]
: Recent Discoveries in the Newfoundland Flora; *J.B.*, *72*, 260-261. [rev.]
: New Variety of *Verbascum nigrum* L.; *J.B.*, *72*, 278-279.
: C. C. Lacaita; *Proc. Linn. Soc.*, sess. 146, 160-162. [obit.]
: *Welsh Flowering Plants*; *J.B.*, *72*, 355-356. [rev.]
: *Euphrasia*; in Ostenfeld & Gröntved, *Flora of Iceland and the Færoes.*
1935 : Botanical Exchange Clubs; *J.B.*, *73*, 25-27. [rev.]
: On some Marsh Orchids; *J. Linn. Soc., Bot.*, 553-592, pl. 31.
: A new British Mint: *J.B.*, *73*, 75-78.
: British Orchids; *J.B.*, *73*, 109. [rev.]
: Salcombe Plants; *J.B.*, *73*, 162-166.
: Harry Fisher; *J.B.*, *73*, 166-167. [obit.]
: *Crepis mollis* Ascherson in Ireland; *J.B.*, *73*, 168 [s.n.], 328 [s.n.]
: *Empetrum hermaphroditum* Hagerup [in Switzerland]; *J.B.*, *73*, 168. [s.n.]
: *The Flowering Plants and Ferns of Cardiganshire*—Salter; *J.B.*, *73*, 230-239. [rev.]
1936 : Botanical Society and Exchange Club Report for 1934; *J.B.*, *74*, 29-30. [rev.]
: Notes on British Euphrasias, IV; *J.B.*, *74*, 71-75.
: The British Robertsonian Saxifrages; *J. Linn. Soc., Bot.*, *50*, 267-289, pls. 6-7.
: *Gentiana Amarella* L. in Britain; *J.B.*, *74*, 163-170.
: *Die Hieracien Norvegens. Piloselloidea* : Omang; *J.B.*, *74*, 213. [rev.]
: New British Marsh Orchids; *Proc. Linn. Soc.*, (*148*), 121-125, pl. 2. [H.W.P. *del.*]
: Enumeration of the species of *Euphrasia* sect. *Semicalcaratae* Benth.; *J.B.*, *74*, 273-288, pl. 611.
: The *Brassica* of Lundy Island; *J.B.*, *74*, 323-326.
1937 : The Flowers of *Campanula latifolia* L.; *J.B.*, *75*, 22-23.
: The Botanical Society and Exchange Club . . . Report for 1935; *J.B.*, *75*, 27-28. [rev.]
: Notes on Poet's Narcissi; *J.B.*, *75*, 53-58.
: Further Notes on the Genera *Fumaria* and *Rupicapnos*, IV; *J. Linn. Soc., Bot.*, *50*, 541-559, pls. 23-24. [H.W.P. *del.*]
: *Notes on the Cornish Flora* . . . Thurston; *J.B.*, *75*, 117. [rev.]
1938 : The Botanical Society and Exchange Club . . . Report for 1936; *J.B.*, *76*, 30-31. [rev.]
: *The Natural History of Raasay* . . . Harrison; *J.B.*, *76*, 31. [rev.]
: A new Variety of *Myriophyllum alterniflorum* DC.; *J.B.*, *76*, 51-53.
: *Flora of Sussex* . . . Wolley-Dod; *J.B.*, *76*, 308-310. [rev.]
: Mr F. J. Hanbury; *Nature*, *141*, 544. [obit.]
1939 : The Botanical Society and Exchange Club . . . Report for 1937; *J.B.*, 77, 26. [rev.]
: Recent Work on Dactylorchids; *J.B.*, 77, 50-56.
: *Flora of Devon* . . . Martin and Fraser; *J.B.*, 77, 294-297. [rev.]
: Notes on Narcissi; *J.B.*, 77, 333-337.
1940 : Notes on British Euphrasias, V; *J.B.*, *80*, 11-13.
: On *Hypericum quadrangulum* L.; *J.B.*. *80*, 25-36.
: Notes on British Euphrasias, VI; *J.B.*, *80*, 89-92.
: An overlooked *Silene* in Devon; *J.B.*, *80*, 94-96.
: H. S. Thompson; *J.B.*, *80*, 102-103. [obit.]
: Notes on *Orobanche*; *J.B.*, *80*, 105-116.
: *Cotoneaster integerrima* Med. in Britain; *J.B.*, *80*, 175. [s.n.]
: Further Notes on British Dactylorchids; *J.B.*, *80*, 177-181, pl. 624.
1941 : Arable Weeds in East Herts.; *J B.*, *79*, 105-109.
: *Narcissus obvallaris* at Tenby; *J.B.*, *79*, 27-28. [s.n.]
: *Carex bicolor* in Scotland; *J.B.*, *79*, 172-173.

1942 : New Species of *Hieracium* in Britain: *J.B.*, 79, 177-183,193-197.
1945 : The Eyebrights of Rhum: *Naturalist* (*815*), 41-44.
: *Limonium transwallianum* in N. Devon: *Naturalist* (*813*), 79.
: (a) Wild Flowers of Ilfracombe: (b) The Ferns: in *The Natural History of Ilfracombe*, 41-48, 48-50.
1946 : The Eyebrights of Rhum [addendum]: *Naturalist* (*816*), 11-15.
: List of British species of *Hieracium*: in A. R. Clapham, Check-list of British Vascular Plants, *J. Ecol.*, *33*, 345-347.
: *Orchis Traunsteinerioides* Pugsl. in Britain: *Naturalist* (*816*), 47.
1947 : *Orchis latifolia* L. or *O. incarnata* L. ?. II: *B.E.C. 1945 Rep.*, 86-88.
: *Spergula pentandra* L. in Britain: *Naturalist* (*822*), 96.
: The Flora of Combe Martin; *Rep. and Trans. Devonshire Association*, *58*, 193-206 (cover dated 1946).
1948 : A Third British *Spergula*: *Naturalist* (*824*), 3-4.
: Nomenclature of Gloucestershire Hawkweeds: in Riddelsdell, Hedley & Price, *Flora of Gloucestershire*, 623-624.
: A Prodromus of the British Hieracia: *J. Linn. Soc., Bot.*, *54*, 1-356, pls. 1-17. [H.W.P. *del.*]
1919-1934 : Many Notes of more or less importance as Referee in the Reports of the Watson Botanical Exchange Club (see 1924).

A. J. WILMOTT.

As one of the few privileged to have known the late H. W. Pugsley abroad as well as in England, I have been allowed to add to the foregoing.

On two separate occasions not long before the war Mr Pugsley visited the Riviera, staying both in Cannes and Mentone.

He came primarily to see the local forms of *Narcissus* "*minor*," alas now so rare that the expeditions to its habitats had to be conducted in the greatest secrecy. There were, however, many other expeditions ranging from brief walks in the Mentone valleys, when I received instruction on identification of critical Fumarias interspersed with appreciation of butterflies, tree spiders and the scenery, to long serious excursions with local botanists (also sometimes the late Mr Francis Druce) and some of a "picnic" nature. There was never a dull moment even for those not botanically minded, for his interests were wide and he endeared himself to all.

That he enjoyed the Continental atmosphere there is no doubt, and he keenly appreciated the good things—food and wines, of both of which he was no mean judge—the brightness and, above all, the beauty of the country. The artist was in him seldom separated from the scientist.

He certainly considered a knowledge of European botany indispensable to British botanists and often deplored the apparent lack of interest among students of the British Flora, not only in the Continental Flora, but in the Continental botanists.

His passing leaves a gap which may perhaps never be filled in these days of specialists and one can but be supremely grateful for having known him for so many years.

M. S. CAMPBELL.

[Other appreciations will be found in *The Times* for November 22, 1947, and *The Naturalist* (824), 13-15, 1948.—J. E. L.]

REVIEWS

Wild Flowers of the Chalk. John Gilmour. Pp. 31, 16 colour plates by Irene Hawkins, one map. London and New York: The King Penguin Books, 1947; 2/6 net.

This is essentially an open-air book for any lover of English country and more especially for the amateur botanist.

Mr Gilmour possesses a rare gift for drawing a vivid picture in few lines and instantly transports the reader to whatever chalk-land is best known to him. What is more, the book is packed with information and few will not learn something from its wide field, ranging from a fragmentary introduction to ecology to the appetising property of Centaury.

Useful hints for identification are given and there is a short bibliography and a map of the chalk outcrop.

Mr Gilmour is to be congratulated on contributing such a delightful addition to the King Penguin series.

The plates are not uniformly good; the colour of *Hippocrepis* is too pale and that of *Asperula* too dark, the flowers of *Blackstonia* too small and one of the flowers of *Cephalanthera grandiflora* too open (Mr Gilmour himself states that it bears half-closed flowers, p. 21); but this is perhaps to be hypercritical.

Praise is due to Mr William Grimmond for his charming cover design and one wishes that the colour of the plates was as well reproduced.

I can confidently recommend this work as one of the best bargains among gift books, whether it be given for the purpose of arousing interest in the chalk Flora or to remind the initiated of a happy waste of Thyme.

M. S. Campbell.

Flora of Alaska and Yukon. Eric Hultén. *Lunds Universitets Årsskrift*, N.F. Avd. 2: Nrs. 1 of vols. 37-42, 1941-1946: (also *Lungl. Fisiog. Sällsk. Handl.*, N.F., Nrs. 1 of vols. 52-57). [10¼" × 7⅝".]

This valuable Flora is particularly interesting to students of the Arctic flora, as it embodies the results of critical work on many of the difficult groups, but it also contains much of interest to British botanists, since a considerable number of British species occur in the area. Some of these are there represented by distinct subspecies, which makes it desirable to re-examine the range of variation shown in the British Isles, and it may require the adoption of subspecific names for some of the British plants. In the first six parts (1066 pages) it has only reached the Rosales (on Dalla Torre & Harms' modification of the Englerian system of classification).

The author—of the Botanical Museum of Lund, Sweden—writes in English with but a few unusual expressions (e.g., " high-grown " where we should say " tall "), and the work is extremely well produced. Each

part concludes with series of uniform maps six to a page, showing the known distribution of all the species. Keys for identification are given at the beginning of each genus, and the text contains very many notes of systematic value under the various species. Full details of the records are given, as well as the general distribution. Most of the material examined is in the United States and Canada, but further material was borrowed from Berlin, Leningrad, Stockholm and Upsala, and there is also rich material in Lund. Unfortunately the historic arctic American material in London resulting from Parry's voyages has not been examined: as it well known, the British Museum is unable to send named material on loan. This possibly affects the nomenclature—which is open to some criticism in several ways, although useful nomenclatural notes are given, with citation of the type localities—for example, *Luzula hyperborea* R. Brown is ignored, although the type can be found. The International Rules of Nomenclature are ignored in several instances. Misidentifications and correct (valid) names are mingled in the synonymy in a way often difficult to disentangle. The author's subspecies are often only slender geographical races sometimes only differing " on an average " of the variation and partly indistinguishable from European specimens. One error surprising in a student of the Arctic Flora is the spelling " Spitzbergen " which should be Spitsbergen, the spelling of the original Dutch discoverers.

Although the northern coastal region is arctic, the southern coastal areas are forested (*Tsuga, Picea, Betula*) and many southern plants reach the area along the Pacific Coast. This is of interest because the comparison of glaciated Britain with Alaska is proper since both areas are on the west of continents in similar relations to the oceans and prevailing winds, whereas comparisons with Greenland are open to many objections. Considerable areas of the country were never covered by ice-sheets during the glacial period there, including most of the Yukon area and the high mountains of the Alaska range. Many endemics occur. The arctic coastal areas were also unglaciated during the Pleistocene except for heavy glaciation in the mountains.

Many British weeds are recorded: ten grasses, *Juncus bufonius*, some Rumices, Polygonums, Chenopodiums and *Atriplex, Stellaria media, Cerastium viscosum, Spergula arvensis* and *Spergularia rubra, Melandrium noctiflorum, Agrostemma Githago, Ranunculus acer* and *R. repens, Thlaspi arvense, Sisymbrium officinale, S. altissimum* and *S. orientale, Descurainia Sophia*, Brassicas and *Raphanus sativus, Capsella Bursa-pastoris* and *C. rubella, Camelina sativa, Neslia paniculata, Turritis glabra, Erysimum cheiranthoides* (thought to be indigenous as well as weed), and *Potentilla Anserina*.

Native British species include both our species of *Woodsia* and a sterile hybrid between them which should be looked for in Britain. *Dryopteris Linneana* has more dissected foliage than is usual in Europe. *Athyrium alpestre* is represented by a var. *americanum* which is considered a distinct species by Maxon: it has more dissected foliage on

an average. *Polypodium vulgare* is the subsp. *occidentale* with midrib of frond and segments pubescent with crisped grey hairs and with more acute teeth. *Botrychium lanceolatum* is scattered, usually occurring with *B. Lunaria*, which " seems to be the case also in other parts of W. America." Nineteen of our ferns are recorded, seven of our Equisetums, all of our Lycopodiaceae, but none of our *Isoetes*. *Zostera marina* occurs, and several of our Potamogetons, *Ruppia spiralis*, and both Triglochins. *Scheuchzeria palustris* is the ssp. *americana*, with longer follicles and somewhat longer style. Ten of our native grasses occur. Among them *Phleum alpinum* is as a var. *americanum* with taller growth, strongly inflated upper sheaths and shorter awns to the glumes, but some specimens seem inseparable from Scandinavian specimens.

Glyceria maxima ("*aquatica*" of British Floras) is considered as a circumpolar species with several geographical subspecies. Twenty of our Carices occur, including those recently added to our list by Heslop Harrison, viz., *C. capitata*, *C. bicolor*, and *C. glacialis*. *Luzula multiflora* occurs, but not *L. campestris*. *Tofieldia pusilla* is common and is accepted as identical with the European *T. borealis*. [*Veratrum album;* which is as near us as Lapland, Central Europe and the Pyrenees (and Spain), presumably reached there from Russia, where it is widespread.] The only British Orchids occurring are *Coeloglossum viride* (as the var. *bracteatum* [which is not identical with the bracteate British plants, being much more extreme and the normal form in Eastern Asia]), *Spiranthes Romanzoffiana*, and *Listera cordata*, the latter as var. *nephrophylla*, with on an average broader leaves with rounder apices, although some specimens are like European ones. In the Aleutian Islands, of which the author has also published a Flora, two types of *Listera cordata* occur, one with green flowers and another with dark purple flowers: [I think that both these occur in the British Isles]. *Goodyera repens* is as the var. *ophioides*, in which the veins of the leaves are bordered with tissue lacking chorophyll, as in all American specimens. Our *Corallorrhiza* and *Hammarbya* also occur.

Of the many Salices, only *S. reticulata* is British. *Myrica Gale* and *Betula nana* occur, the latter as ssp. *exilis*, differing only in its glandular less pubescent branches. The *Rumex Acetosa* is the spp. *alpestris*, an arctic-montane subspecies with broad leaf-sinus and the ochreae only occasionally somewhat lacerated. Their *Rumex Acetosella* is all ssp. *angiocarpus*. *R. domesticus*, *R. maritimus* (? introduced), and *Oxyria digyna* occur. *Polygonum amphibium* is as ssp. *laevimarginatum*, without the harsh bristly margins to the floating leaves, and with ochreae with herbaceous margin in land forms. *Polygonum Bistorta* is as ssp. *plumosum*, with smaller growth and cuneate-based lower leaves. *Polygonum viviparum* is one of the commonest species throughout the area. *Salicornia herbacea* and *Suaeda maritima* have a few records. *Montia limprosperma* (type locality: Aleutian Islands) does not there root at the nodes as in Europe (*M. rivularis*) and as the rooting type is, in

America, only found in Western Newfoundland and New Brunswick, the author considers that the two forms are more distinct than usually supposed. *Honckenya peploides* and a ssp. *major* are separated, the latter characterised by its large growth with long stem, often rather narrow leaves and often several-flowered cymes: similar specimens occur in Scandinavia, "but on an average the difference is clear." Two forms of *Caltha palustris* are separated, the northern one being var. *arctica* with more radicant habit and more coarsely sinuately toothed leaves with more open sinus, but, as the author says, the *Caltha* races are closely related and not sharply "delimitated" [as is also found to be the case in Britain]. Typical *Ranunculus acer* is introduced, but there is a native var. *frigidus*, related to a Russian form. *Ranunculus sceleratus* is represented by a western American ssp. *multifidus*, which in addition to more dissected leaves (on an average) has the seeds without the usual transverse ridges and with only a circle of minute depressions on the sides of the seeds. Their *Thalictrum minus* is the Lapland ssp. *kemense*, with large fruits and small leaflets. *Subularia aquatica* is known from several localities. All Cochlearias are put under *C. officinalis* [but authorities have never been able to agree over the subdivision of this group!]. The *Cakile* is treated as *C. edentula* ssp. *californica*, one of three forms recognised as varieties by Fernald in *Rhodora* (1922: p. 21). [*C. edentula*, formerly considered a variety of *C. maritima*, is the only species recorded for Iceland by A. Löve in his recent Flora of that island. The British plants need re-examination as plants with fruits of "*edentula*" are frequent in Britain, and were the only kind seen in the Outer Hebrides by me in 1947.] *Arabis hirsuta* is represented by two American subspecies: [it is possible that a study of the variation in Britain would reveal more than one form]. *Sedum Rosea*, in addition to one record, has two subspecies, the common ssp. *integrifolium*, with low habit, green or slightly glaucous leaves more evenly distributed on the stem, and purplish-black flowers with purplish-black filaments and yellow anthers, which is the prevailing type in E. Asia and W. America. Yellow-flowered specimens with yellow anthers also occur, though rarely, "which seem to belong to the main type of the species." The var. *frigidum* is more robust, with strongly glaucous leaves. [Certainly there are in Britain both colour forms!] The *Saxifraga caespitosa* is placed as ssp. *sileniflora*, which has the capsules ovoid, slightly constricted at the base of the sepals. [*Saxifraga tenuis* is treated as a variety of *S. nivalis*, occurring here and there within the range of *S. nivalis*, but to me it has always seemed to be a clear-cut arctic species, and in Britain it has never been found.] Four forms are distinguished under *Dryas octopetala*. *Sanguisorba officinalis* is restricted to unglaciated areas; its British distribution should be re-examined.

It is clear that intensive study of some of our British species is needed, and further parts of this interesting work will be welcomed when they appear.

A. J. WILMOTT.

Instructions to Contributors.

PAPERS

are invited both from Members of the Society and others. They should have a bearing on the taxonomy or distribution of British Vascular Plants or Charophytes. Papers should preferably be typed, but clearly written MSS can be accepted. They should be double-spaced and written or typed on one side of the paper only. The form adopted in this part should be used for citations and references. Full references should be put at the end, except where special reasons exist (e.g., the citation of place of publication of a plant name) or in very short papers. Illustrations, which may take the form of line drawings or photographs, will be considered for publication. Twenty-five separates of each paper are given free to the author, and further copies may be obtained on payment; requests for extra copies should be made when proofs are returned. Papers should be sent to the Editor, Dr E. F. Warburg, Druce Herbarium, 9 Crick Road, Oxford.

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Instructions will be given in the Year Book. They are also given in the B.E.C. 1943-44 Report, p. 695. Records may be sent either to the Editor or to Mr E. C. Wallace, 2 Strathearn Road, Sutton, Surrey.

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ABSTRACTS

Offers of assistance will be appreciated. They may be made either to the Editor or to Mr A. H. G. Alston, British Museum (Natural History), Cromwell Road, London, S.W.7. For instructions, see B.E.C. 1946-47 Report, p. 347.

OBITUARIES

These should include date of birth and death, summary of life so far as events have a bearing on botanical work, whereabouts of herbarium and any manuscripts and chief botanical publications. Offers to write obituary notices may be sent either to the Editor or to Mr J. E. Lousley, 7 Penistone Road, Streatham Common, London, S.W.16.

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RUBUS WATSONII SP. NOV.

By W. H. Mills.

This hitherto undescribed British bramble, in some respects related to *R. rubristylus* W. Wats. (*R. Newbouldii* Rog., non Bab.) and *R. granulatus* Muell. & Lef. (*R. oigocladus* var. *Bloxamianus* Rog.), occurs over a considerable area of the south-east Midlands. I have long known it in various Huntingdonshire (v.-c. 31) localities (Bevill's Wood, Monks' Wood and West Perry) and have found it also in Hertfordshire (v.-c. 20) (Mardley Heath) and in Buckinghamshire (v.-c. 24) (Great Brickhill) and Mr W. C. R. Watson and Dr J. G. Dony have found it in several places in south Bedfordshire (v.-c. 30) where I have also seen it.

Rubus Watsonii belongs to the Section *Apiculati*, Series *Foliosi*, in Watson's classification (1946, *J. Ecol.*, *33*, 337) and to the Group *Sub-Koehleriani* in that of Rogers. It has the following characters:—

Stem beginning with a long low arch, faces plane or somewhat furrowed, dark green overlaid with purplish-brown on the exposed side, pilose. Main prickles sub-equal, chiefly on the angles but irregularly spaced, with compressed purplish-red bases and slender yellowish points, declining or slightly falcate. Intermediate prickles few. Pricklets and stalked glands crowded, the latter dark red and mostly about 0.7 to 1.0 mm. long.

Leaves 3-nate and 4- and 5-nate pedate, more commonly 3-nate; dark green and strigose above, paler and pilose on the veins beneath; later leaves tending to be felted beneath. Leaflets more or less arched between the nerves. Serration shallow, wide and irregular, the teeth many obtusangular, tipped with distinct mucros. Terminal leaflet broadly rhomboidal-obovate with short broad-based point and emarginate frequently rather truncate base, three to four times as long as its petiolule. Petiole obscurely furrowed above, pilose, with crowded dark red stalked glands and mostly falcate declining prickles. Stipules narrowly linear, pilose and glandular.

Flowering branch angular, pilose, with crowded stalked glands and gland-tipped acicles and with unequal falcate and declining prickles. Leaves ternate, the terminal leaflet considerably contracted at the base, sometimes almost cuneate in the upper leaves. Under surface of the uppermost leaves softly pubescent, with prominent veins and usually some greyish-green felt. In well developed panicles the ternate floral leaves are usually followed by an ovate simple leaf and then by one or two lanceolate leaves.

Lower part of panicle consisting of erect-patent many-flowered branches in the axils of the three or four uppermost leaves, with not infrequently an additional 1- or 2-flowered branch in an upper axil. Ultra-axillary part of the panicle dense and sub-cylindrical with gently

ascending cymose branches. Rhachis in its upper part, panicle branches, and pedicels clothed with long dense greyish villous hair burying the closely set red stalked glands, and armed with very numerous nearly straight and patent slender prickles, purplish-red at the base, averaging about 2.5 mm. in length. Lower part of the rhachis armed with stronger falcate and declining prickles.

Flowers about 2.5 cm. in diameter. Sepals externally grey with a pale margin, felted and pilose, glandular and sparingly aculeolate, subpatent after the fall of the petals, afterwards very loosely reflexed. Petals white or white faintly tinged with pink, narrowly elliptical. Stamens only slightly exceeding the reddish based styles. Carpels glabrous. Fruit ellipsoid.

Rubus Watsonii sp. nov.

Turio angulatus, faciebus planis vel leviter excavatis, pilosus, glandulis aculeolisque crebris obsitus; *aculei* majores subaequales, plerumque ad angulos dispositi, compressi, reclinati; minores sparsi; *folia* ternata vel rarius pedato-quinata, supra parce pilosa, subtus viridia, praecipue ad nervos pubescentia, sat grosse inaequaliter et parum profunde serrata; *foliolum terminale* late rhombeo-ovatum, breviter acuminatum, basi emarginatum, petiolulo proprio triplo vel quadruplo longius; *stipulae* lineares, glandulosae.

Ramus florifer angulatus, pilosus, glandulis crebris aculeisque inaequalibus obsitus; *folia* ternata, superiorum foliola terminalia rhombea vel cuneata; *inflorescentia* basi interrupta, foliosa, superne densa, ad apicem rotundata; rhachis apicem versus, ramuli pedicellique dense hirsuti et glandulosi, aculeis rectis purpureis crebris armati; *sepala* cinereo-tomentosa hirsuta glandulosa aculeolata, in fructu sub-patula; *petala* anguste elliptica, alba vel dilute rosea; *stamina* stylos vix superantia; *germina* glabra; *fructus* ellipsoideus.

Type (from Bevill's Wood, Hunts., July 1946, W. H. Mills) in the Cambridge University Herbarium.

Rubus Watsonii is of moderately vigorous growth and is easily recognisable by its deep green more or less plicate broadly rhomboidal-obovate terminal leaflet and conspicuously prickly villous panicle which sharply distinguishes it from *R. rubristylus* and *R. granulatus*. *R. rubristylus* is further differentiated by its strongly grooved stem, its crisped leaf-margins, the longer stalk of its terminal leaflet and its bright red styles. *R. granulatus* has the additional distinction of a glabrescent stem with much shorter, more crowded and yellowish-brown stalked glands.

The name *Rubus Watsonii* is given in recognition of the contributions of Mr W. C. R. Watson to our knowledge of the British *Rubi*.

A NEW SPECIES OF EROPHILA IN BRITAIN: E. CONFERTA

By A. J. Wilmott.

Erophila conferta mihi, sp. nov. Rosulae in plantis bene evolutis densae; foliis latis laete viridibus, externis anguste lineari- vel lanceolato-spathulatis, internis latioribus ellipticis vel oblanceolatis (c. 12 × 6 mm.), subintegris, petiolis brevibus late alatis, laminarum marginibus conspicue ciliatis, superficiebus glabris vel interdum apicem versus pilis simplicibus paucis obtectis. Caules numerosi (5)6-9(11), glabri, subbreves, 3-4.5 cm. alti. Racemi initio densi, dein laxiusculi, 5-10-flori vel (bene evoluti) 9-12-flori. Flores magni conspicui; sepalis late ovatis obtusis; petalis sepala tris excedentibus, 3 mm. longis, latis (basi late cuneatis), ad medium bifidis lobis latis subelliptico-oblongis. Siliculae in pedicellis 7-9 mm. longis, parvae, 3½-3¾ × 2-2¼ mm., ellipticae, inflatae, apice subtruncatae, stylo brevissime apiculatae.

The description is taken from specimens (now in the British Museum, Natural History) collected on 27th February 1938 by Miss M. S. Campbell at Layer Marney in N. Essex (v.-c. 19), originating from seeds collected on 8th March 1934 in the Island of Rhodes, between the harbour and Phileremo, and sown in 1935 in a pot in a greenhouse. From there the plant escaped to a heap of earth just outside the greenhouse, and from this heap of earth the plant had in 1938 spread to neighbouring parts of the greenhouse area. In 1947 for the first time was seen by Miss Campbell outside the garden, and therefore needs to be recorded. In 1945 alpines from a sink in one of the greenhouses were sent to Miss Campbell's house—Easter Tegarmuchd—near Aberfeldy, Perthshire (v.-c. 88), and planted out in a garden bed, and in March 1946 *Erophila conferta* appeared in that bed, evidently grown from seed in the soil sent with the alpines. In 1947 more plants appeared.

In 1938 I had named it "cf. *E. inflata*" on account of its inflated elliptic pods, but since then I had become more familiar with the plant and had realised that in no other way did it resemble *E. inflata*, which was originally described from material collected on Ben Lawers, a few miles distant from the garden in which the new plant has established itself. Further examination showed that it is very different from *Erophila praecox* (Stev.) DC. (cf. O. E. Schulz, 1927, *Pflanzenreich 4. (105)*, 365), although like that it is an early flowering plant. Although *E. praecox* is recorded from Rhodes by Dr K. H. Rechinger in his recent *Flora Aegaea* (1943, 231) I was forced to the conclusion that the plant now described was distinct from any form described by Schulz. By a lucky chance, Dr Rechinger visited the British Museum the day after I had come to that conclusion and I was able to ask him to which of the plants listed in his *Flora Aegaea* he would refer the

plant. His reply was that he had never seen an *Erophila* at all like it, and that it seemed so remarkable and so distinct that to him it would appear to be a really separate species. With this confirmation of my own opinion, I have therefore described it as such. It is easily recognisable by its coarse rosettes of broad nearly subglabrous but ciliate leaves, numerous dense stems with dense conspicuous flowers, and small inflated fruits.

Since the above was written, further living material from Perthshire has been available, from which the following notes were made:— Stems with numerous but scattered spreading or patent pili in the lower half, almost or quite glabrous in the upper half. Pedicels patent. Sepals 1¼-1½ mm. long, green turning brown-red to purplish, ovate obtuse, strongly convex on the back, with narrow membranous margins and with spreading rather shorter pili mostly in the distal half when the sepals are full-grown. Petals about 3.2 mm. long and 2-2½ mm. broad, lobes slightly unequal, usually rather porrect (parallel) except when the flower is wide open. Fruit about 4 mm. long and 2¾ mm. broad; style 0.3 mm. long, cylindrical. Seeds 16-18 in each loculus, about 0.5 mm. long, broadly elliptical, dark brown when ripe.

Seed from Layer Marney has been scattered in my garden at Merton Park, Surrey.

T. B. FLOWER'S LIST OF READING PLANTS

By the late J. S. Attwood and J. S. L. Gilmour.

Some confusion appears to exist as to the correct title, author and date of the work in which Thomas Bruges Flower published his "List of some of the more interesting plants indigenous to the vicinity of Reading." In Druce's *Flora of Berkshire*, p. cxciii, the following entry occurs:—"Flower, T. Bruges, F.L.S., A List of plants seen about Reading, published in Robertson's *Environs of Reading*, 1843." On page clxix of the same work, however, Druce says "In 1845 a guide to Reading was published under the title of 'J. C. Robertson's *Environs of Reading*'." In Britten & Boulger's (1931, *Biographical Index of British Botanists*, ed. 2, 110, and in 1900, *J. Bot.*, *38*, 32) the date is also given as 1845. In the *Catalogue of the Kew Library* the list is cited as follows:—"[Flower, Thomas Bruges.] A List of the more interesting plants . . . of Reading [from W. Fletcher's 'Tour round Reading,' 1840] 8vo.," while on the actual copy of the list at Kew, the following note is written in ink "Drawn up by Mr T. B. Flower from observations made during a visit to Reading in 1841, and published in No. 5 of the Tour Round Reading, by . . . ?."

In order to clear up this confusion we have examined a complete set, in the original wrappers, of the work in question (now in Mr N. D. Simpson's library). It was first issued in parts. No. 1 was entitled "A Tour Round Reading, Being a Guide to its Environs, with Historical and Pictorial Sketches," by W. Fletcher. There is no date given, but as, on the back of the wrapper, annuals for 1841 are advertised, and as there is an advertisement in No. 3 dated Jan. 1st, 1841, it can be deduced that No. 1 was published in 1840. On the front of the wrapper is printed "To be completed in ten numbers." Only six numbers, however, were actually published. No. 2 bears the same title and author's name as No. 1. No. 3 is entitled "A Tour Round Reading, With Historical and Pictorial Sketches," "Begun by W. Fletcher, Continued by Edward J. Nieman." No. 4 bears the same title as No. 3 but Fletcher's name is omitted and the work described as being "By Edward J. Nieman." No. 5 (in which Flower's list appears on pp. 169-171) is entitled simply "A Tour Round Reading," and is "Edited by J. G. Robertson." No. 6 is entitled "The Environs of Reading," "by J. G. Robertson."

In addition to the issue in separate numbers, described above, Nos. 1-5 were issued bound in one volume entitled "The Environs of Reading," edited by J. G. Robertson, Vol. 1, dated 1843. On the cover it is stated that the work was "to be completed in two parts." The second part was presumably to consist of Nos. 6-10, but of these, as stated above, only No. 6 appeared.

Flower's list, therefore, appeared in two distinct forms; firstly in No. 5 of the serial publication, entitled "A Tour Round Reading," and secondly in Part I of "The Environs of Reading," 1843, both edited by J. G. Robertson. No. 5 is not dated, but it contains an advertisement in which is quoted an undated review, from the *Reading Mercury*, of the *Berkshire Guide, Almanac and Advertiser*. The Editor of the *Mercury* has very kindly searched his files for this review and has informed us that it appeared in two parts in two successive issues of the paper, dated August 6th and 13th, 1843. As the issue in one volume of Nos. 1-5 is dated 1843, it is clear that No. 5 must have appeared between August 13th, 1843, and the end of the year

When citing to Flower's List in full, therefore, it is suggested that it should be described as follows:—

FLOWER, T. B. "A List of Some of the more Interesting Plants indigenous to the Vicinity of Reading," in *A Tour Round Reading*, No. 5, pp. 169-171, edited by J. G. Robertson, [1843]; also issued in *The Environs of Reading*, part 1, pp. 169-171, edited by J. G. Robertson, 1843, which consists of Nos. 1-5 of *A Tour Round Reading* bound in a single volume.

JOHN BLACKSTONE, APOTHECARY AND BOTANIST (1712-53)

By Douglas H. Kent.

The discovery of John Blackstone's herbarium at Ripon Museum has caused a renewed interest in that diligent but little known early botanist, and study of botanical literature reveals that apart from Trimen & Dyer's account of his life (1869, *Flora of Middlesex*, 389-91) all other biographies are based on the details given by Richard Pulteney in his *Historical and Biographical Sketches of the Progress of Botany, . . . 2*, 270-74, with added *extracts from the Literary and Scientific Correspondence of Richard Richardson, M.D., F.R.S., . . .* ed. by Dawson Turner, (1835), 351-55. Examination of Blackstone's herbarium and various genealogical sources have however revealed a number of new facts and in this paper these are brought together for the first time. A numbered list of the references used is appended at the end of the paper, and the occurrence of these numbers in the text indicates the authority for the particular fact cited.

John Blackstone was born in London in 1712, the first child of Edward Blackstone, Ironmonger and Citizen of London, and his wife Sarah, the daughter of Francis Ashby of Breakspeares, Harefield, Middlesex (12, 14 and 19). His father was apparently in comfortable circumstances and John probably received a good early education. About 1729 he was possibly apprenticed to an apothecary in the Strand (18), though the Apprenticeship Books of the Inland Revenue fail to confirm the transaction.

Shortly before Christmas, 1730, Edward Blackstone died, suddenly, leaving his widow with three sons, John, Edward (c. 1715-56) and Francis (1722-1809) (20). Edward was buried at Harefield on December 28th (10) and his widow and two youngest sons took up residence at that place, staying with Francis Ashby at Breakspeares. John continued to live in the Strand, but spent his holidays with his family at Harefield. He soon became interested in the study of botany and by 1734 had begun his explorations in the Harefield district (18). It was in this year that he discovered *Dentaria bulbifera* L. growing abundantly in the Old Park, and in the following year he recorded *Orchis abortiva fusca* [*Neottia nidus-avis* (L.) Rich.], in Whiteheath Wood on Harefield Common, but very rarely, and *Geranium Robertianum, flore albo*, in a hedge by the roadside near Rislip [Ruislip] Town (3).

In 1736 he began a correspondence with Sir Hans Sloane, Dr J. J. Dillenius, Isaac Rand and many other eminent botanists of the day (18). His paternal grandfather, John Blackstone (c. 1650-1716) had been a prominent member of the Apothecaries Company of London (Warden, 1712-13) (1), Apothecary (1695-1712), liberal benefactor to St Bartholomew's Hospital (11), and a friend and associate of Sir Hans (20). It was

possibly for this reason that the baronet encouraged the younger Blackstone in his studies. During the summer Blackstone had a long illness and spent his convalescence tramping the countryside around Harefield and Uxbridge in search of new plants. December however found him again in the Strand, and on the 11th of the month he addressed a letter to Dr Richard Richardson of North Bierley, Yorks., advising him of the discovery of *Dentaria*:—"By good fortune I have discovered the *Dentaria baccifera* J.B. to be a native of this Island—The place where it grows is in a large wood near a village call'd Harefield, about eighteen miles north-west from London, where it grows in such plenty, that some acres of ground are cover'd with it." Then follows the first reference to the proposed "Fasciculus":—"There are several other rare plants to be found thereabouts, of which a catalogue is now ready for the press; and I hope for your encouragement, the value when printed being a trifle." That Blackstone received a favourable reply is certain, for a further letter to Richardson, dated 18th December, gives a full and complete account of the intended work and the events which led to its preparation; he writes: "I have for these last three years been employ'd in making a collection of the native English plants; and having an opportunity of going to see my friends pretty often, I made it my business to see as many of the adjacent places as my time would permit, and to collect such plants as offer'd themselves in the course of my walks, without ever intending to publish anything on this subject. But, being detained last Summer by a long illness, near four months on the spot, I found so many rare plants that I thought it worthwhile to make a catalogue of them, and show it to some skilful persons in that science for their approbation, which succeeded to my desire; and I only beg leave to let you know, that the plants there mentioned were gathered almost solely by myself, as also that the catalogue is not general; being only intended as an essay for a more particular search thereabouts. Your opinion in relation to the middle counties of England being not well search'd is most certainly right; and I am pretty well assur'd that Buckinghamshire would itself afford ample speculation for the curious botanist, from such few places I have been on that account. I purpose to print my work by subscription, tho' the price of it cannot exceed five shillings; and I desire no money till the book is deliver'd."

Blackstone spent Christmas, 1736, with his family at Breakspeares, and in the early Spring of 1737 was again there, apparently recovering from another illness, as in a letter to Sir Hans Sloane, dated April 8th, he says ". . . The air proves serviceable to me in general tho' there are still some symptoms remaining which a perfect state of health ought to be without, particularly the swelling of my legs after walking, and the heat of my hands and feet towards night. I have been on horse back once, but suffer'd so much by it that I have not ventur'd since." The summer of this year saw the publication of his *Fasciculus Plantarum circa Harefield sponte nascentium*. This was a small catalogue arranged in alphabetical order with synonyms taken from the works of Bauhin, Gerard, Parkinson, together with others in common use at the time.

The plant name was followed by the general place of growth, the precise locality in the case of local or rare plants, and the period of flowering. The plants were mainly Phanerogams, but a few Cryptogams were included. The total number of plants given was 527, and the work contained an appendix giving a concise description of Harefield, of which the following is an extract:—"The soil within this compass is various; that of the South and East parts being a strong clay, very productive of Elm and Oak, which thrive very well here. The North and West parts, bordering on Hertfordshire and Bucks., is generally a dry chalk and stony land. The Parish is in circumference about sixteen miles, and is, in great measure surrounded with woods, almost of all sorts, and is perfectly well water'd; for besides the River Colne, which runs a small distance from the village, springs are scarcely anywhere more frequent. This place is particularly remarkable on the account of an extraordinary fine spring call'd Gulch Well, that arises at the foot of a chalk hill, and produces at its first appearance, with a very strong current, a body of water, two feet deep and four feet broad. Several attempts have been formerly made, towards bringing the delicate water of this spring to supply the Cities of London and Westminster: But, as nothing of that kind has hitherto been effected, its water only serves to furnish the River Colne, already almost overcharg'd with Springs." The volume was dedicated to Sir Hans Sloane.

Blackstone had apparently completed his apprenticeship and the summer months found him staying at Charlbury in Oxfordshire where resided his uncle, John Blackstone, Keeper of Wychwood Forest (9). During his stay Blackstone compiled a MS. Catalogue of plants to be found in the area (4). August found him staying at the house of Alexander Benet, at Marden Ash, near Chipping Ongar, Essex. Another uncle, William Blackstone (d. 1727), also an apothecary, owned property near here, and it was possibly through him or his widow Ann that John made Benet's acquaintance (13, 14). It was from Marden Ash that he addressed a letter to Sloane on the 18th: "It is my duty to acquaint you with such acquisitions as I have made in relation to my beloved study which are as follows, *Nymphaea alba*, in the river at Abridge, *lutea*, in the moat at Ongar Castle, and in the river at Chelmsford, *Saponaria* [*Saponaria officinalis* L.] in a hedge near Weale Hall, *Calamintha vulgaris* [*Satureia ascendens* (Jord.) Druce or *S. Nepeta* (L.) Scheele], by the roadside between Ingatestone and Chelmsford most abundantly, *Inula Campana* [*Inula Helenium* L.] in the Orchard at Smith's Hall plentifully, *Adiantum album* [*Asplenium Ruta-muraria* L.], on Wisford Bridge, *Menthastrum spicatum folio longiore candicante* [*Mentha longifolia* (L.) Huds.], by the roadside near Chipping Ongar." He goes on to say that he is perfectly well and hopes to visit Braintree and Colchester. His improved health was short-lived, however, for in another letter written to Sloane eight days later we read: "I am sorry to let you know that on Sunday last my old complaint of my side returned very smartly and still continues to a great degree . . . I can not come to town till the symptoms are somewhat abated. I have met

with nothing new in Botany, being not able to walk far . . . you will please excuse all faults being in much pain . . ."

The autumn found Blackstone's health again improved and he visited Charlbury (6), but in late September he was again at Harefield devoting himself even more ardently to the study of his favourite subject. In a letter to Sloane, written on the 29th, he says " I yesterday rec'd a most obliging letter from Dr Richardson, who has been so good as to give a very good character to my small performance . . . and advises me to pursue my searches into Natural History, and I must own the study grows more and more agreeable to me to search after anything new, however I have found the *Blattaria Plinii* [*Verbascum Blattaria* L.] in another place not mentioned in my *Fasciculus*." That he had acquired a taste for Mycology is obvious, for the letter continues: " There are many sorts of Fungi which grow plentifully hereabouts, and if you would be so kind as to lend me Steerbeck's *Theatrum Fungorum*, it would come very safe by Uxbridge Coach, which inns at the Black Bull in Holborn, and will till after Saturday set out at two o'clock in the afternoon. I would take particular care of it, and return it in a fortnight, by which time I must come to town, being obliged to go into Oxfordshire soon afterwards. I hope, Sir, that from the singular respect you have already shew'd me you will excuse my request, but I cannot help pursuing my Botanick study, and I hope it may in time prove advantageous to me." It would appear that the eminent Sir Hans suggested to Blackstone that the time had come for him to go into business on his own account, as in a letter addressed from Breakspeares on 26th October Blackstone writes " I wish it was in my power to give you a good account of my affairs in regard to fixing in business, but nothing of that kind is propos'd till Xmas is over, so that I purpose on Friday to go into Oxfordshire. I hope, Sir, this absence will be no prejudice to your esteem for me, but to engage in business without any foundation would not be deem'd a prudent action, therefore as I am obliged to be depending, I must wait till those I depend on, are pleas'd to make a beginning for me. If you write soon be pleas'd to direct for me at Mr Gibsons at Pembroke College, where I shall be about ten days, afterwards I am obliged to go to a relation of my own name at Charlbury, who has a great value for me."

December found Blackstone still at Charlbury and in a letter written on the 6th and addressed to Sloane he says " I had wrote you before, but was willing to give you the best account I could of my success in the prosecution of Botany, and not withstanding the season is so far advanced I have found the following plants to add to the Catalogue which I made during my stay here in the Summer, viz., *Stachys Fuchsii* [*Stachys germanica* L.], in the Forest Lane near Charlbury plentifully, *Alsine foliis tenuissimis* [*Arenaria tenuifolia* L.] and *Plantago minor monanthos Parisiensis* [*Littorella lacustris* L.], in the bogs near Cornbury, and in other parts of the forest. *Campanula pratensis flore conglomerato* [*Campanula glomerata* L.], in barren places not uncommon. Mosses are to be met with here in plenty, but 'tis my misfortune not to

be acquainted with their difference, but I intend to collect a parcel before I go from hence, tho' I purpose to be at Oxford on Friday next." He then reveals that his mother is ill, giving a morbid account of her disorders, but concludes on a more cheerful note: "I hope, Sir, that tho' absent, I still have part of your favour, for had my relations been willing to have fix'd me in business, I would not have left London, but as soon as Xmas is over, I am determined to get into business some way, for I believe my health is established."

In 1738 Blackstone was admitted into the Society of Apothecaries of London, and by September was established as an apothecary in Fleet Street, "at the Griffin near Salisbury Court, in the Parish of St Brides" (1), and being kept busy in his new profession apparently had little or no time for botany. About 1739 he married a widow named Webb (19, 20), and despite marital and business affairs found time to make at least one excursion into Kent, collecting a number of maritime plants including *Trifolium maritimum* Huds. at Sheerness (21).

The meetings held by the Society of Apothecaries brought Blackstone into close touch with many of his fellow members. These included Joseph Miller of Bishopsgate, who was elected a Warden of the Company in 1737 and Master in 1739; Isaac Rand of St James's, Hay Market; Robert Nicholls of Tothill Street, Westminster, who was elected a Warden in 1739 and Master in 1741; John Field of Newgate Street, John Wilmer of Bishopsgate Street, and William Watson of Aldersgate Street (1). Miller, Rand and Nicholls were all keen botanists and considerably older than Blackstone and no doubt encouraged the young apothecary in his studies, but Watson was three years his junior, and appears to have been his closest friend and companion. Both Miller and Rand were closely associated with the Apothecaries Garden at Chelsea, and it was probably from them that Blackstone obtained many of the exotic plants which are preserved in his herbarium.

About 1740 Blackstone suffered a blow by the death of his wife; this was further aggravated by a slump in trade, possibly due to keen competition from rivals as many other apothecaries traded in the district. By September his financial difficulties had become so great that he was obliged to appeal to Sloane for help. In his letter he says "Trade is very dull and money very hard to get at, so that if you think my work deserves any encouragement should be grateful to you for it now, and shall ever be proud of doing further service when you command." Whether the baronet complied with this rather direct request is not known.

In 1741 he accepted John Vernon of Malpas, Cheshire, as his apprentice (15), and his business appears to have been in a more flourishing state. During 1742, Blackstone married Mary, the only daughter of Richard Abbott, Painter-Stainer and Citizen of London (19). The marriage took place at St Saviours, Newgate Street, London (19). During 1743 Blackstone suffered further losses by the death of his grandfather, Francis Ashby, in May (20), and his mother in June (12). Both Ashby

and Sarah Blackstone were buried at Harefield (10), and in her will Sarah bequeathed to John the sum of £30 (12).

Early in 1744 Blackstone was corresponding with Mr Halfhide, " an eminent apothecary and curious botanist of Cambridge " (21), Thomas Knowlton, gardener to the Earl of Burlington at Londesborough, Yorks. (21), and Mr Thornbeck, a surgeon of Ingleton, Yorks. (16). He had also become acquainted with Ambrose Dawson (16), Physician to St George's Hospital, London, and a keen amateur botanist. Dawson was a Yorkshireman by birth and it was probably with him that Blackstone visited the north of England, collecting *Dianthus plumarius* L. on Fountains Abbey walls, *Polygonatum officinale* (L.) All. near Settle, and *Sedum villosum* L., *Antennaria dioica* L. and *Pyrola rotundifolia* L. at Ingleboro' (21). During the summer his wife presented him with a daughter, Maria, who died in infancy (19). His father-in-law, Richard Abbott, died in July 1745 (2), bequeathing to his daughter Mary the sum of £500 (12).

The *Specimen Botanicum quo Plantarum plurium rariorum Angliae indigenarum loci natales illustrantur* was published in 1746. This small work of Blackstone's was regarded by Pulteney as " a valuable addition to the third edition of Ray's *Synopsis*," and was the last book to be published in England on the indigenous botany, before the system of Linnaeus gained the ascendancy over that of Ray. The volume was arranged in the same manner as the *Fasciculus*, but contained the localities of 366 species of the more rare and local British plants. A number of Harefield plants given in the *Fasciculus* were repeated, but there were numerous records from all parts of Britain. Apart from Blackstone, records were contributed by Watson, Dawson, Wilmer, Thornbeck, Nicholls, Miller, John Hill, Samuel Hurlock (hanged for armed robbery at Tyburn in 1747 (20)) and many others.

Blackstone had by this time acquired some property at Harefield (10) and in 1747 was again botanizing in his favourite locality, collecting among other plants *Juncellus omnium minimus capitulis Equiseti* [*Eleocharis acicularis* Sm.] on Uxbridge Moor (7). During the summer months of 1748 he made excursions into Northampton and Buckinghamshire (21), and in October contributed a letter to the *Gentleman's Magazine* dealing with a cure for cattle distemper by means of Jesuit's Bark. He mentions cures which had been effected at Enfield and Southgate. In September of this year his wife presented him with a second daughter, Sophia (19).

About 1752 Blackstone's health again began to fail and he died at Harefield on 11th March 1753 (19). He was buried in the churchyard near to his father and mother on the 18th (10). In his will he bequeathed to John Abbott, his wife's brother, " my largest punch bowl and silver ladle together with my seal engraved with a man at work," to his brother Francis " my Cornolian Seal with 2 heads engraved in silver, the silver can engraved with my grandfather's coat of arms and my mortuary penknife." The rest of his estate he left to his wife. His personal books were apparently sold, some of them coming into the possession of Dr

Thomas Birch, Secretary of the Royal Society, 1752-65, and eventually finding their way into the British Museum when Birch's library was presented. Among the books in the museum is a copy of Ray's *Synopsis* in which Blackstone has marked the plants contained in his herbarium. It bears the inscription " Plantae quib. in hoc libro haec nota (x) praefixa est, in horto sicco nostro asservatur. J. Blackstone, 1736, 1/12."

His name was perpetuated by Hudson in the genus *Blackstonia*, and a number of his plants are preserved in the Sloane Herbarium, but a specimen of *Dentaria* is the only plant localized. This small collection, numbering less than 50 plants, was for many years recognized as Herb. Blackstone. This, however, was disproved in 1947 by the discovery of three large volumes of Blackstone's plants at Ripon Museum, Yorks. The circumstances leading up to the discovery of the collection are of interest and I am indebted to Messrs A. H. G. Alston and A. J. Wilmott of the British Museum (Natural History) for the following details. A number of the sheets on which the plants are mounted are endorsed " H.L.", this had been misinterpreted at Ripon as " Herb. Linnaeus ", but Mr Alston writes that it probably refers to Herb. Lister (i.e. Martin Lister, 1638-1712). Specimen sheets were sent to the Linnean Society for their scrutiny, and Blackstone's handwriting and initials were identified by Messrs S. Savage, of the Linnean Society, and Alston. The collection which is in fairly good condition has now been transferred to the British Museum (Natural History). It contains many British and exotic plants mostly named in pre-Linnean nomenclature, though unfortunately only about 50 sheets are localized. The collection also contains a set of Sir John Hill's (1716-75) cryptogams. Most of the sheets are labelled in Blackstone's hand-writing, but some have been added by others, and a few are dated as late as 1800.

Mary Blackstone died in December 1801, aged 78, and was buried near John in Harefield Churchyard (10). Sophia married Hector, son of the Rev. David Davis, in 1780. She died in December 1827, and was buried at St Mary's, Islington (19). Among John's better known relatives may be mentioned his cousin, Sir William Blackstone (1723-80), Judge of the King's Bench.

I am indebted to Messrs A. H. G. Alston and J. E. Lousley for much helpful advice while compiling this paper.

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EQUISETUM RAMOSISSIMUM AS A BRITISH PLANT

By A. H. G. Alston.

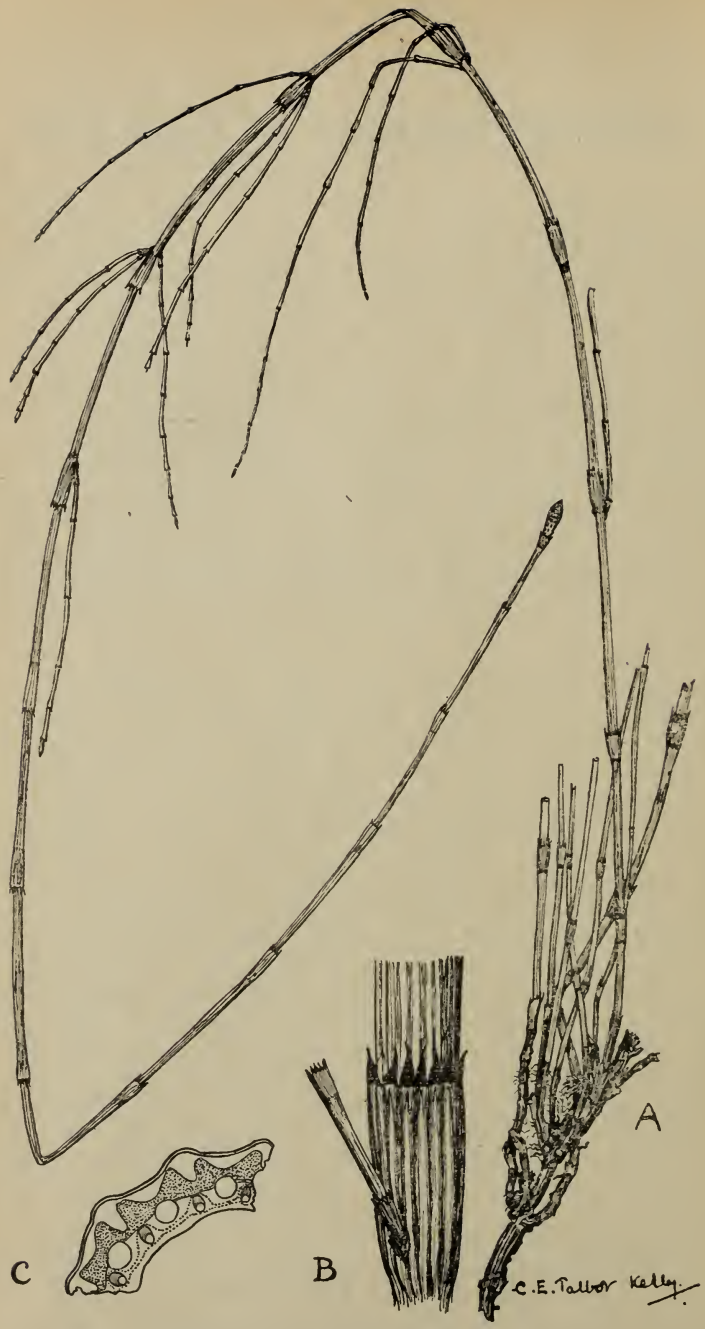
Specimens of an *Equisetum* were recently sent for identification by Mr H. K. Airy Shaw. The plant showed the apiculate strobili characteristic of the section *Hippochaete*, which is represented in Britain by *E. hiemale* L., *E. Moorei* Newm., *E. trachyodon* A. Br., and *E. variegatum* Schleich. The structure of the teeth of Mr Shaw's plant came nearest to those of *E. Moorei*, but in that plant the teeth are deciduous and the section of the stem is different. Comparison with continental material shows that it is a form of the variable *E. ramosissimum*. The names *E. elongatum* and *E. ramosum*, which are synonyms of *E. ramosissimum*, have appeared in British books through confusion with *E. trachyodon*. When that plant was first discovered, W. J. Hooker (1842, 451) placed it under *E. elongatum* Willd., and Bentham (1858, 620) used the name *E. ramosum* DC. for it. The differences were pointed out and *E. ramosissimum* was figured (as *E. ramosum*) by Deakin (1857, 30-31).

The following description has been made from the British specimens:

Equisetum ramosissimum Desf., 1800, *Flora Atlantica*, **2**, 398. Rhizome black, subterranean, with nodes about half an inch apart, ascending, scabrous, rooting at nodes. Barren and fertile stems alike, 1 ft. 9 ins. to 2 ft. 6 ins. high, somewhat rough, with scattered tubercles, and about twelve rounded angles, dull green when dry. Central cavity more than half the diameter of the stem, with a ring of smaller cavities between the vascular bundles, surrounded by a continuous band of green parenchymatous tissue. Endodermis double, with one ring outside the vascular bundles, another within. Internodes usually between $1\frac{1}{2}$ and $2\frac{1}{2}$ inches long; sheaths about $\frac{1}{4}$ inch, green, becoming brown with a black ring at base. Teeth $\frac{1}{10}$-$\frac{1}{5}$ inch long, with black centres, narrow white margins, and a more or less persistent hair-like apex. Lateral branches numerous in lower half of the main stems, often elongate, with a central cavity, and a black and papyraceous basal sheath, the lowest internode of the branches less than one-third of the length of the corresponding sheath of the main stem. Strobilus apiculate, usually on the apex of the main stem only, with a long naked stem beneath it, $\frac{1}{4}$ to nearly $\frac{1}{2}$ an inch long, with black sporophylls and sulphur-yellow sporangia. Spores globose, smooth, 45μ in diameter, sulphur-yellow, with 4 elaters, about 120μ long, smooth, slightly expanded towards the apex.

S. Lincolnshire (v.-c. 53): near Boston, in long grass by river. Seen along a limited stretch only, 24th July 1947, *H. K. Airy Shaw*.

Among British species this comes nearest to *E. Moorei* Newm., which Kümmerle (1931, 147) considered a hybrid between *E. hiemale* and *E.*



A.—Habit (±½). B.—Sheath and base of branch (±2½). C.—Diagrammatic section of stem.

ramosissimum. *E. Moorei* has been found at Shere in Surrey[1] and in Ireland.

E. Moorei is almost unbranched, with twisted, often deciduous teeth and, as might be expected in a hybrid, it apparently does not produce fertile spores. The transverse section of the stem of *E. Moorei* is also different from that of *E. ramosissimum*, as the band of parenchyma is not continuous and the angles of the stem appear truncate instead of rounded. Sterile plants of *E. ramosissimum* may be distinguished from the common British species by the scabrous rhizome. This is pubescent in *E. arvense* and glabrous in *E. palustre* and *E. limosum*.

E. ramosissimum was originally described, by Desfontaines, from Tunisia, but is common on both sides of the Mediterranean. In France it is very rare north of the Loire, but there are isolated localities near Erquy, on the north coast of Brittany (Lloyd 1898, 426), and at Clérey on the left bank of the Seine in the Aube department (Briard 1881, 268). It is not reported from Belgium (Goffart 1941) nor Luxemburg, but has recently been found in Holland from three places in the Rhine valley (Jansen and Wachter 1929). It is not rare in southern Bavaria, but becomes rarer northwards with rather isolated localities by the Rhine near Duisburg, by the Wupper near Leichlingen (Süssenguth 1935, 81), on the bank of the Elbe at Teufelsbrück near Hamburg (Knuth 1887)[2], and there is an old record from Neustrelitz (Milde 1867, 457). In Poland the plant has been reported from Plock, N.W. of Warsaw (Raciborski and Szafer 1919), and from Johannisdorf, near Mewe, on the R. Weichsel (Süssenguth 1935, 81). In the U.S.S.R. the northern limit is reached in the Volga-Kama and Volga-Don areas (Iljin 1934, 109). Lecoq's (1858, 313) record from Lithuania has not been confirmed. From Scandinavia *E. ramosissimum* is not recorded (Hylander 1941), but *E. Moorei* has been found there (Kümmerle 1931, 154). The record from the Färoe Islands, Trevelyan 1836, cited by Milde (1867, 457), Süssenguth (1935), and other authors, is regarded as doubtful by Ostenfeld (1901): the specimen cannot now be found at Kew. Outside Europe the area of the species extends to the far east and to the Cape of Good Hope.

The habitat, where recorded, has been alluvial or sandy, often near the banks of rivers, such as the Rhine and Loire. This agrees with the type of habitat in Britain, which it seems reasonable to regard as another outlying locality. Reid (1915, 38) has recorded *E. ramosissimum* Desf. from pliocene deposits at Teglin on the Dutch-Prussian border.

I am indebted to M. Jean Callé, Paris, and Mme. Czeczott, Warsaw, for confirming my account of the distribution of the species, and to Mr F. Ballard, Kew, for searching for Trevelyan's specimen.

I am indebted to Mr J. E. Lousley for a reference to Syme, *English Botany*, **12**, 172, who states that the species is " said by Schkuhr to grow

[1]Druce (1930) referred the Shere plant to *E. occidentale* (Hy) Coste, which has been quite rightly reduced to *E. Moorei* by Schaffner (1931, 97) and other authors.
[2]This locality is disputed by Süssenguth (1935).

in Wales." The reference is to Christian Schkuhr (1809, *Kryptogamische Gewächse*, **1**, 178), and his statement reads " Die Pflanze erhielt ich unter diesem Namen von Schleicher aus Wallis, und aus der italienischen Schweiz." It may be translated " I have received the plant under this name from Schleicher, from the Valais and from Italian Switzerland." J. C. Schleicher of Bex, Canton de Vaud (d. 1827), was the author of a *Catalogus Plantarum in Helvetia cis- et transalpina sponte nascentium* (1800) and several later editions. *Equisetum ramosum* Schleich. appears in the third (1815, 32), and fourth (1821, 38) editions, but not in the first (1800). I have not seen the second edition. The record is repeated by Druce (1920, *B.E.C. 1919 Rep.*, 797). It seems clear that Syme did not realise that Wallis was the German name of the Canton de Valais and that he mistranslated it as Wales. Schkuhr's Herbarium is, or was, at Halle University according to *La Phytographie* (p. 447).

Map showing northern limit of *Equisetum ramosissimum* in Europe.

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KEY TO THE BRITISH SPECIES OF SALIX

By K. H. Rechinger.

[In addition to all the species known to be natives of Britain, the key includes the commonly planted species, *S. daphnoides* and *S. acutifolia*. *S. rosmarinifolia*, which has been erroneously recorded as British in the past, is included for the sake of comparison, though Dr Rechinger states that he knows of no records. Of *S. coaetanea*, he writes that he has seen sheets in Herb. Mus. Brit. and Herb. Corstorphine, of which he has not kept details, which are at least very like this species and which might belong to it. The following species are included; the names are given in the order and with the numbers of the *British Plant List*; the synonyms in brackets are the names used there when they differ from those used by Dr Rechinger: —

1. *pentandra* L.
2. *fragilis* L.
3. *alba* L.
4. *triandra* L.
5. *purpurea* L.
6. *viminalis* L.
8. *Caprea* L.
[–. *coaetanea* Flod.].
9. *aurita* L.
10. *atrocinerea* Brot
10(2). *cinerea* L.
11. *repens* L.
11(2). *arenaria* L.
12. *nigricans* Sm. (*Andersoniana* Sm.).
13. *phylicifolia* L.
14. *arbuscula* L.
15. *lanata* L.
16. *lapponum* L.
17. *myrsinites* L.
18. *herbacea* L.
19. *reticulata* L.
†22. *daphnoides* Vill.
†22c. *acutifolia* Willd. (*daphnoides* var. *acutifolia* Döll).
[24. *rosmarinifolia* L.]

—Ed.]

KEY FOR FERTILE MATERIAL (after B. Floderus).

1a. (*Chamaetia*). Procumbent dwarf shrubs. Bud scales persistent like a cap after the development of the leaves. Leaves on glandless petioles (except sometimes *S. reticulata*), short, ± rounded, 2-5-nerved (i.e. 2-5 pairs of lateral nerves reaching the leaf margin); at least above shining green and glabrous (except sometimes *S. reticulata*); beneath with scattered, long ± straight hairs or glabrous. Floral shoots terminal, with comparatively large leaves (if compared with those of the sterile shoots), (except *S. myrsinites*), remaining persistent after the catkin has fallen. Bracts ± unicoloured, broad and rounded. Nectaries 1 or 2, entire or cleft. Stamens 2 with free filaments.

2a. Leaves long-petioled, 2-3-nerved, above depressed-reticulate, beneath strongly elevated-reticulate and greyish-white, exstipulate, coriaceous, entire. Nectaries 2, ± corolla-like, several-cleft. Filaments violet, pubescent. Styles very short. Capsules subsessile, pubescent ..... *S. reticulata*.

2b. Leaves shorter petioled, 3-5-nerved, green beneath. Nectary solitary, tooth-like (except sometimes *S. herbacea*). Filaments glabrous. Styles ± long.

3a. Leaves light green, short-petioled, 4-5-nerved, finally elevated-reticulate above. Bracts thin, light-coloured, with scattered, short, curved hairs. Capsules pedicelled, glabrous. Catkins few-flowered ..... *S. herbacea.*

3b. Leaves dark green, very glossy above. Bracts firm, larger, ± emarginate, purple-black, with denser, long, straight hairs. Capsules subsessile, hairy. Nectary entire, purple-red, as are the filaments. Styles long ..... *S. myrsinites.*

1b. (*Caprisalix*). Shrubs or trees. Bud scales deciduous at the development of the leaves (except sometimes *S. arbuscula*). Leaves on glandless petioles, often long, 5-many-nerved. Floral shoots usually not terminal (i.e. arising below 1 to several sterile terminal shoots), with comparatively small leaves or bracts falling with the catkin. Bracts usually dark-tipped. Nectary solitary (the inner) and tooth-shaped. Stamens 2 with free filaments (except *S. purpurea*).

4a. Previous year's shoots (in dried state) not glaucous-pruinose.

5a. Leaves 5-15-nerved.

6a. Styles short (except sometimes *S. repens*, *S. arbuscula*) or inconspicuous.

7a. Capsules long-pedicelled.

8a. Branches, at least older ones, with longitudinal protuberances (striae), 3-30(-100) mm. long on the wood. Leaves not silky pubescent beneath. Buds robust, obtuse.

9a. Shrubs. Striae dense and long on 2-5-year-old branches. Leaves rather long-petioled, above depressed reticulate, beneath smoothly grey-pubescent.

10a. Tall shrub, sometimes treelike. Buds ovoid-conic, pubescent when young, soon glabrescent. Petiole 0.5-1.5 cm. long. Leaves with 8-15 side-nerves; above soon glabrescent and somewhat shiny, with indistinctly impressed reticulation; beneath covered with reddish-brown hairs, especially along the nerves. Bracts obovate or rounded ± obtuse, ± densely bearded. Styles short but distinct. Stigmas divergent or spreading ..... *S. atrocinerea.*

10b. Low or tall shrub showing a characteristic outline (flattened above). Buds persistently pubescent. Petiole 0.3-1.0 (-1.6) cm. long. Leaves with 10-15 (-18) side-nerves, densely pubescent on both sides, not glabrescent; above with impressed reticulation; beneath finally bluish-grey, never reddish-brown. Bracts broadly cuneate-spathulate, obtuse, covered with long silky subvillous hairs. Styles short but usually distinct. Stigmas bilobed or bifid, erectly divergent ..... *S. cinerea.*

10c. Shrub, 1-2 m. high. Buds triangular, glabrous, shiny. Petiole 0.2-0.6 cm. long. Leaves with 6-10 side-nerves; above greyish-green, ± laxly hairy, with very distinctly impressed reticulation; beneath pubescent or subtomentose, hairs never reddish. Bracts narrow, ± obtuse or often acute, covered with long hairs and bearded. Styles absent. Stigmas erect, capitate ..... *S. aurita.*

9b. Trees or tall shrubs. Striae only on older (at least 5-10 years) branches, irregular, scattered, about 4-15 mm. long. Leaves finally coriaceous, large, 5-9-nerved; above almost smooth and glossy with longer, straighter hairs. Shoots ± patent, coarse, knotty.

11a. Previous year's shoots glabrous. Leaves stipulate, long-petioled, ovate; above dark green and finally almost glabrous; beneath when young glossy at base, greyish-white with denser, crowded hairs. Floral shoots subsessile, ± leafless. Catkins erect, long, straight. Bracts acute, brownish-black, with dense, long, straight hairs. Filaments usually glabrous ..... *S. Caprea*.

11b. Previous year's shoots grey-pubescent. Leaves usually exstipulate, with shorter petioles, obovate; above ± silky-pubescent; beneath smoothly grey pubescent. Floral shoots patent, with longer petioles, often with large leaves. Catkins usually incurved, shorter, often abnormal in the upper part. Bracts blunt, brown, with more scattered, shorter, curved hairs. Filaments hairy ..... *S. coaetanea*.

8b. Branches (older ones) usually with scattered, ± point-tipped striae up to 3(-5) mm. long. Leaves very shortly petioled, small; above finally elevated-reticulate; at least beneath silky pubescent (except sometimes *S. repens*) with adpressed, usually short straight hairs directed upwards. Small shrubs.

12a. Previous year's shoots narrow, light-coloured, glabrous. Leaves exstipulate, ovate, finally glabrous at least above. Floral shoots ± long-peduncled, comparatively many- and large-leaved. Catkins cylindrical, finally lax-flowered. Bracts ± light-coloured, laxly hairy. Filaments, capsules and their pedicels glabrous ..... *S. repens*.

12b. Previous year's shoots ± long, dark, pubescent. Leaves beneath more densely silky-pubescent. Floral shoots numerous, not terminal, short-peduncled, few- and small-leaved. Catkins shorter, dense-flowered. Bracts dark. Branches erect. Style ± inconspicuous.

13a. Previous year's shoots narrow, laxly hairy, often with crowded basal shoots. Leaves exstipulate, ± erect, thin, comparatively long, almost linear, with entire-sinuate, finely glandular, flat margin, usually 10-12-nerved; above dark green and finally ± glabrous; beneath smooth, silky-pubescent with short hairs. Bracts hairy. Filaments glabrous. Stigmas long, cylindrical ..... *S. rosmarinifolia*.

13b. Previous year's shoots coarse, densely grey-pubescent. Leaves (often) stipulate, finally recurved, firm, short, obovate, with laxly and ± sharply glandular-serrate, recurved margin, 5-8-nerved; on both surfaces densely silky-pubescent, eventually with long hairs; above finally dull greenish-grey with patent, curved hairs also. Bracts densely grey-canescent. Filaments hairy. Stigmas short, ± capitate ..... *S. arenaria*.

7b. Capsules short-pedicelled, hairy. Small shrub. Sterile shoots glabrous. Leaves usually exstipulate, short-petioled, small, serrate, usually 7-12-nerved, finally glabrous above. Floral shoots long-peduncled, large-leaved. Catkins small. Bracts light-coloured. Filaments glabrous ..... *S. arbuscula*.

6b. Styles long, glabrous. Shrubs (except sometimes *S. nigricans*).

14a. Sterile shoots glossy, glabrous. Leaves exstipulate, serrate, usually 8-12-nerved; above glossy and (like the petiole) glabrous; beneath pale blue-green. Capsules pedicelled, pubescent. Floral shoots short-peduncled, small-leaved. Bracts dark. Filaments glabrous ..... *S. phylicifolia.*

14b. Sterile shoots hairy. Leaves stipulate, hairy on the petiole at least above and on the base of the midrib. Capsules glabrous (except sometimes *S. lanata*).

15a. Previous year's shoots comparatively narrow and smooth, hairy or glabrous. Leaves not golden hairy, serrate. Floral shoots not terminal. Catkins comparatively small and lax-flowered. Bracts ± light-coloured with fine, curved hairs. Capsules ± long-pedicelled ... *S. nigricans.*

15b. Previous year's shoots very robust, knotty, felted tomentose with long hairs. Young as well as basal leaves ± golden glossy with very long, straight hairs. Floral shoots terminal, subsessile, ± golden hairy and leafless. Catkins very large, dense-flowered. Bracts brownish-black, with long, coarse, straight hairs. Capsules short-pedicelled or sessile. Styles very long ..... *S. lanata.*

6c. Styles very long, hairy. Shrub. Sterile shoots white-pubescent. Leaves exstipulate, ± narrow, usually 8-12-nerved, white felted-tomentose. Floral shoots subsessile, leafless. Bracts dark, pubescent. Filaments glabrous. Capsules not or inconspicuously pedicelled, felted-tomentose ..... *S. lapponum.*

5b. Leaves 15-many-nerved, long, narrow. Tall shrubs or trees. Branches ± whip-like Floral shoots numerous, subsessile. Bracts ± dark. Capsules pubescent.

16a. Leaves alternate, stipulate, ± linear, almost entire, silky-canescent beneath with short, straight hairs, parallel with the lateral nerves. Filaments free, glabrous. Styles long, hairy ..... *S. viminalis.*

16b. Leaves alternate as well as ± opposite, exstipulate, narrowly ligulate, towards the apex sharply glandular-serrate, usually 15-30-nerved, finally glabrous. Filaments connate; pubescent. Styles inconspicuous ..... *S. purpurea.*

4b. Previous year's shoots (at least in a dry state) glaucous-pruinose. Trees or tall shrubs. Leaves stipulate, narrowly lanceolate, glandular-serrate; above glossy, dark green and usually glabrous. Bracts dark, with dense, long, straight hairs. Filaments glabrous.

17a. Previous year's shoots ± erect, robust. Sterile shoots hairy towards the apex. Leaves with ovate-lanceolate stipules; on a short ± dark and hairy petiole (like the base of the midrib), canaliculate above; blades lanceolate, usually 11-15-nerved. Floral shoots usually 3-8. Bracts blunt. Capsule-pedicels very short, ± hairy. Capsules usually glabrous ..... *S. daphnoides.*

17b. Previous year's shoots ± pendulous, narrow. Sterile shoots glabrous. Leaves with longer and narrower stipules, petiole longer, glabrous, light-coloured, flat above (like the midrib); blade longer and narrower usually 15-18-nerved. Floral shoots usually 1-2. Bracts acute. Capsule-pedicels longer, glabrous. Capsules glabrous ... *S. acutifolia.*

1c. (*Amerina*). Trees or tall shrubs. Bud scales deciduous at the appearance of the leaves. Petiole glandular-margined towards the apex. Leaves ± long, 10-17-nerved, glandular-serrate. Floral shoots not terminal, their leaves deciduous with the catkin. Bracts pale, one-coloured. Nectaries usually 2, an outer (absent in the female flowers of *S. triandra* and *S. alba*) and inner, simple or cleft. Stamens 2 to several, with free, pubescent filaments. Capsules glabrous.

18a. Leaves lanceolate, usually 12-17-nerved. Floral shoots usually 4-8, with comparatively few, small, ± entire leaves. Stamens 2-3, filaments with crisped hairs.

19a. Shrub, rarely a tree. Leaves with large, usually broad, long-persistent stipules, long-petioled, usually oblanceolate, acute and almost straight, coarsely serrate, sharply reticulate, ± glabrous. Stamens 3. Capsule-pedicels long. Styles almost inconspicuous ... *S. triandra.*

19b. Trees, rarely shrubs. Leaves with narrow, quickly deciduous stipules, narrowly lanceolate, obliquely acuminate, slightly reticulate. Stamens 2.

20a. Branches ascending. Sterile shoots ± white-canescent, comparatively tough. Leaves short-petioled, densely fine-serrate, at least when young white, silky with long hairs. Floral shoots numerous, ± erect, short-peduncled, with small, entire or irregularly and laxly glandular-serrate leaves. Bracts comparatively short, blunt, with crisped hairs. Capsule-pedicel and styles almost inconspicuous ..... *S. alba.*

20b. Branches patent. Sterile shoots glabrous, very fragile at base. Leaves long-petioled, broader, more laxly and coarsely serrate, glabrous. Floral shoots fewer, spreading, with longer peduncles and with larger, entire leaves. Bracts longer, more acute, with straight as well as crisped hairs. Capsule-pedicel and style ± long ..... *S. fragilis.*

18b. Leaves usually obovate, ± straight-pointed, usually 10-12-nerved, glossy, glabrous. Floral shoots fewer, long-peduncled, with more numerous, larger, regularly and densely glandular-serrate leaves. Stamens about 5, filaments with almost straight hairs. Shrub, rarely a tree. Capsule-pedicel and style short ..... *S. pentandra.*

KEY FOR STERILE MATERIAL.

1a. (*Chamaetia*). Procumbent small shrubs. Bud scales persistent, after the leaves expand, as a narrow cap, split along the inside and through the summit. Petiole glabrous (except *S. reticulata*), glandless. Blade short, ± rounded, recurved, infolded along the midrib, with 2-5 pairs of ± S-shaped lateral nerves running at an acute angle, mainly from the basal part of the midrib; above glossy green and (except *S. reticulata*) glabrous; beneath glabrous or with scattered, adpressed, long, straight, finally usually deciduous hairs.

2a. Leaves on a very long petiole which is hairy above, 2-3-nerved, beneath greyish-white and strongly elevated-reticulate, above depressed reticulate and hairy at least on the base of the midrib, exstipulate, coriaceous, entire. Espalier-shrub with comparatively robust, crooked branches and shoots ..... *S. reticulata.*

2b. Leaves more shortly petioled, 3-5-nerved, green on both sides, ± white-dotted.

3a. Dwarf shrub with mainly subterranean branches. Sterile shoots very short with usually 2-3 exstipulate leaves ..... *S. herbacea.*

3b. Small shrub with procumbent or ascending, coarser, crooked, knotty branches. Sterile shoots comparatively coarse, glabrous or with lax, long, straight hairs and about 5, stipulate, short-petioled, coriaceous, usually obovate, sharply glandular-serrate, mostly 5-nerved, conspicuously elevated-reticulate, glossy, dark-green leaves, persistent a long time after withering ..... *S. myrsinites.*

1b. (*Caprisalix*). Erect (except *S. repens* and sometimes *S. arbuscula*) shrubs or trees. Bud-scales deciduous as the leaves expand (except sometimes *S. arbuscula*), ± split along the inner side. Petioles exstipulate, leaf-blade usually longer, narrower and ± flat, with 5-many pinnate pairs of lateral nerves.

4a. Previous year's shoots (dried) not glaucous-pruinose.

5a. Leaves 5-15-nerved.

6a. Leaves spirally arranged, not silky-hairy beneath.

7a. Leaves above depressed-reticulate, ± dull (except *S. Caprea*, *S. coaetanea*); grey-tomentose at least beneath.

8a. Branches lacking striae. Leaves entire (except sometimes *S. lapponum*), with long hairs. Shrubs. Sterile shoots grey- or white-tomentose.

9a. Previous year's shoots canescent, coarse. Leaves (at least the terminal ones) with acuminate stipules, 5-8-nerved ..... *S. lanata.*

9b. Previous year's shoots laxly hairy or glabrous. Leaves usually exstipulate, usually 8-12 nerved, faintly reticulate ..... *S. lapponum.*

8b. At least old branches with striae, ± smooth-margined (except rarely *S. Caprea* and *S. coaetanea*). Leaves stipulate (except *S. coaetanea*), sinuate-margined or ± bluntly toothed or glandular-serrate, coarsely elevated-reticulate beneath and with a dull greyish tomentum of patent, short, strongly curved hairs.

10a. Trees or tall shrubs. Striae (only present on old—at least 5-10 years—branches) irregularly and laxly spread, usually 4-15 mm. long. Previous year's shoots ± spreading, coarse, knotty. Buds robust. Leaves ± coriaceous, large, 5-8-nerved, almost smooth above and in a juvenile stage glossy with somewhat adpressed, almost straight hairs, mainly parallel with the side-nerves.

11a. Previous year's shoots glabrous. Buds with recurved tip. Stipules usually large. Leaves long-petioled, usually broadly ovate, at the base ± rounded, sinuate-margined or dentate-serrate, with 6-9 side-nerves at right angles to the midrib and finally strongly elevated beneath. Blade above glossy, dark-green, finally subglabrous; beneath in a juvenile stage at base glossy grey-white with more closely packed hairs ..... *S. Caprea.*

11b. Previous year's shoots dull grey-tomentose. Buds with short, straight point. Leaves usually exstipulate, with shorter petioles, obovate, narrowed towards the base, with sinuate or entire margin and usually 5-8 side-nerves, at an acute angle to the midrib, narrower and less elevated beneath. Blade ± silky-glossy above with denser, more adpressed, longer and straighter hairs, smoothly grey-tomentose beneath ..... *S. coaetanea.*

10b. Shrubs. Striae (present on 2-5 year old branches) dense, 3-30(-100) mm. long. Previous year's shoots smoother. Buds smaller. Leaves rather long-petioled, thinner, smaller, 7-15-nerved, above depressed-reticulate, beneath dull greenish-grey, on both surfaces grey-tomentose.

12a. Tall shrub, sometimes treelike. Buds ovoid-conic, pubescent when young, soon glabrescent. Petiole 0.5-1.5 cm. long. Leaves with 8-15 side-nerves; above soon glabrescent and somewhat shiny, with indistinctly impressed reticulation; beneath covered with reddish-brown hairs especially along the nerves ..... *S. atrocinerea.*

12b. Tall or low shrub, showing a characteristic outline (flattened above). Buds persistently pubescent. Petiole 0.3-1.0(-1.6) cm. long. Leaves with 10-15(-18) side-nerves, densely pubescent on both sides, not glabrescent, above with impressed reticulations; beneath finally bluish-grey, hairs never reddish ..... *S. cinerea.*

12c. Shrub, 1-2 m. high. Buds triangular, glabrous, shiny. Petiole 0.2-0.6 cm. long. Leaves with 6-10 side-nerves; above greyish-green, ± laxly hairy, with very distinctly impressed reticulation; beneath pubescent or subtomentose, hairs never reddish ..... *S. aurita.*

7b. Leaves above ± smooth, glossy, green; glabrous or hairy mainly on the midrib.

13a. Tall shrubs or trees. Previous year's shoots brownish, usually hairy. Leaves stipulate, glandular-serrate, above hairy at least on the petiole and the base of the midrib ... *S. nigricans.*

13b. Small shrubs (except *S. phylicifolia*). Previous year's shoots reddish-brown, glossy, glabrous. Sterile shoots narrow, ± glabrous. Buds glabrous. Leaves above more glossy, beneath ± blue-green (except sometimes *S. arbuscula*).

14a. Branches erect, ± straight, brownish. Sterile shoots glabrous, even when young. Leaves comparatively long-petioled, remotely serrate, faintly reticulate, smooth, not white-dotted, beneath pale bluish-pruinose ..... *S. phylicifolia.*

14b. Branches ascending, shorter, more slender, crooked, with membranously flaking bark, finally light grey. Sterile shoots, when young, glabrous or scantily hairy. Leaves short-petioled, smaller, more densely serrate, densely and finally elevated-reticulate, white-dotted, pale green to somewhat blue-grey beneath. Bud-scales frequently persistent after the leaves expand ... *S. arbuscula.*

6b. Leaves both spirally arranged and ± opposite, short-petioled, small, with the midrib excurrent or not, subentire, gland-margined, frequently drying black, finally elevated-reticulate above, smoother and silky-hairy beneath (except sometimes *S. repens*) with adpressed, ± straight hairs directed parallel with the midrib. Low shrubs with narrow branches.

15a. Previous year's shoots slender, brownish. Leaves exstipulate, ± erect, thin, usually narrow and flat-margined, plane, above finally glossy dark-green and ± glabrous, beneath silky with adpressed, short, straight hairs. Buds acute with scattered short hairs or glabrous.

16a. Branches procumbent or ascending. Previous year's shoots short, crooked, light brown, glabrous. Sterile shoots hairy or glabrous. Leaves very small, ovate-elliptical, 4-6-nerved, rarely glabrous beneath. Shrublet ..... *S. repens.*

16b. Branches erect. Previous year's shoots ± long, straight, dark brown, pubescent. Sterile shoots shortly grey-pubescent. Leaves comparatively long, almost linear, usually 10-12-nerved, densely and sharply reticulate, usually densely silky-hairy beneath ... *S. rosmarinifolia.*

15b. Previous year's shoots rather long, robust, straight, brownish-black, usually densely canescent. Leaves (mainly large, terminal) often stipulate, finally patent, firm, short, obovate, with recurved tip, recurved margin and, when young, ± revolute sides, remotely and sharply glandular-serrate in the upper part, usually 5-8-nerved, above finally densely and sharply reticulate and dull greyish-green with both patent and curved hairs, beneath white-glossy with dense hairs, among which are also longer and ± curved ones. Young leaves densely and glossily white-tomentose on both surfaces. Buds coarse, dull grey-canescent. Branches patent. Sterile shoots glossy white-tomentose with long hairs ... *S. arenaria*.

5b. Leaves long, narrow, 15-many-nerved. Sterile shoots long, whip-like, many-leaved.

17a. Tall shrubs or trees. Previous year's shoots yellowish. Buds ovoid, ± hairy. Leaves spirally arranged, with entire or sinuate margin, which is remotely glandular towards the apex, beneath densely silky-tomentose with adpressed, short, straight hairs, directed parallel with the side-nerves ..... *S. viminalis*.

17b. Shrub. Previous year's shoots reddish, glossy. Buds almost linear, finally brown-red, glabrous. Leaves both spirally arranged and opposite, narrowly ligulate, upwards sharply glandular-serrate, usually 15-30-nerved, finally glabrous ... *S. purpurea*.

4b. Previous year's shoots (at least when dry) whitish-blue. Trees or tall shrubs. Buds large, acuminate. Leaves with glandular-serrate stipules (the leaves supporting the catkin-buds with the stipules large and connate with the base of the elongated petioles). Blade acuminate, sharp-pointed, glandular-serrate, glossy and dark-green above.

18a. Previous year's shoots ± erect, coarse, greenish-brown to whitish-blue. Sterile shoots and buds usually laxly grey-tomentose, finally ± glabrous. Leaves with broad-based stipules. Petiole short, grooved above like the adjacent part of the midrib, ± pubescent with spreading, short hairs. Blade narrowly lanceolate, usually 11-15-nerved, densely white-dotted above, often laxly hairy when young ... *S. daphnoides*.

18b. Previous year's shoots pendulous, long, narrow, brown-red, rarely whitish-blue. Sterile shoots and buds glabrous. Leaves with longer, narrower stipules. Petioles long, yellow, glabrous, above flat like the adjacent part of the midrib. Blade narrowly lanceolate to almost linear, usually 15-20-nerved, not or only in the uppermost part white-dotted, glabrous ..... *S. acutifolia*.

1c. (*Amerina*). Trees or tall shrubs. Bud-scales deciduous after the leaves expand, ± split along the inner side. Leaves stipulate, petioles grooved above, glandular near the apex. Blades usually long, sharply acute, glandular-serrate, flat, with 8-17 pinnate pairs of side-nerves.

19a. Stipules densely glandular on the base of the upper surface. Leaf-blade lanceolate, acuminate, usually 12-17-nerved.

20a. Shrub or shrubby tree with flaking bark. Previous year's shoots irregularly furrowed. Buds spreading, maroon-coloured, ± glabrous. Leaves with large, broad, long-persistent stipules, long-petioled, usually oblanceolate, densely and coarsely serrate, usually 12-15-nerved, densely and finally elevated-reticulate, above glossy dark green, beneath usually dull and glaucous, glabrous or with scattered hairs in the juvenile stage. Sterile shoots usually laxly hairy, finally glabrous ..... *S. triandra*.

20b. Trees with large trunks. Previous year's shoots ± smooth. Buds adpressed. Leaves with narrowly acuminate, soon deciduous stipules, obliquely acuminate, usually 12-17-nerved, pale blue-green or blue-grey beneath.

21a. Branches ascending. Previous year's shoots ± pendulous, narrow, reddish or yellowish-brown, with scattered hairs or glabrous, comparatively tough. Sterile shoots glossy, silky-hairy with long hairs. Buds narrowly ovoid, acute, red, white-tomentose, finally laxly hairy. Leaves with narrowly lanceolate stipules, short-petioled, narrowly lanceolate to almost linear, long-acuminate, closely and finely serrate, densely and finely white-dotted above, glossily white-silky with long hairs on both surfaces, finally almost glabrous above ..... *S. alba.*

21b. Branches spreading. Previous year's shoots coarse, knotty, glossily brownish-yellow, very fragile at the base. Sterile shoots glabrous. Buds ovoid, short-pointed, glossily brown, glabrous. Leaves with obliquely cordate stipules, long-petioled, firmer, narrowly lanceolate, more laxly and coarsely serrate, laxly and coarsely white-doted above, glossy and dark-green, frequently drying black when young, glabrous ..... *S. fragilis.*

19b. Stipules short, on the upper face usually glandless, soon deciduous. Leaf-blade obovate-oblanceolate, usually short- and straight-pointed, densely serrate, usually 10-12-nerved, not or only at the summit white-dotted, glossy green, glabrous. Shrub or ± narrow-stemmed tree. Previous year's shoots glossy green- or red-brown, tough. Sterile shoots when young, as well as the buds and leaves, viscid and with a balsam odour, frequently drying black, glabrous. Buds spreading, glossy, glabrous ..... *S. pentandra.*

APHANES MICROCARPA (BOISS. ET REUT.) ROTHM. IN BRITAIN

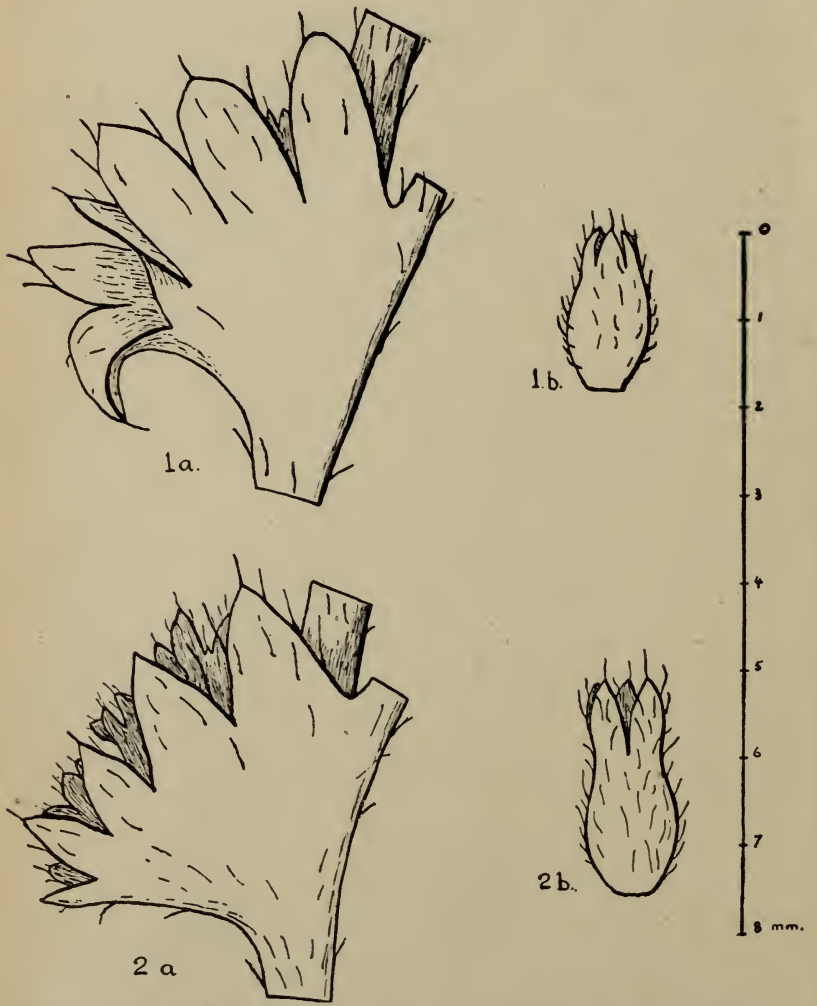
By S. M. Walters.

The Linnaean genus *Aphanes* was shown by Rothmaler (1935; 1937) to consist of a number of species of small annual plants, of which the most widely distributed is *A. arvensis* L. (1753, *Sp. Plant.*, ed. 1, 123) (*Alchemilla arvensis* (L.) Scop.). Until this work was published, it had been assumed that all N. European material belonged to this Linnaean species; but Rothmaler was able to show that *Aphanes microcarpa* (Boiss. & Reut.) Rothm. (1937) (*Alchemilla microcarpa* Boiss. & Reut., 1842, *Diagn. Hisp.*, 11) first described from Spain, actually occurred quite widely in Europe. In 1937, Rothmaler and Hylander published a joint paper describing the two species in Sweden; this was followed by a paper on the Danish material of *Aphanes* by Gudjonsson (1941); and finally Rothmaler (1944) published an account of *Aphanes* which included a record for *A. microcarpa* from " Oxford, England " (presumably based on material in continental herbaria). Inspection of British herbarium material has shown that, as in Sweden and Denmark, *A. microcarpa* is actually widespread in Britain, where it has never previously been distinguished from *A. arvensis*.

The most reliable characters on which to distinguish *A. microcarpa* from *A. arvensis* are those of the shape and size of the fruiting urceole crowned by the persistent calyx. In *A. microcarpa* the urceole + calyx is about $\frac{2}{3}$ as long as in *A. arvensis* (" fruits " of *A. microcarpa* are 1.4-1.8 mm., and of *A. arvensis* 2.2-2.6 mm. in length). The calyx-teeth themselves are very much smaller in *A. microcarpa*, and usually converge, whereas in *A. arvensis* they are more conspicuous and spreading from a distinct " neck " at the top of the urceole (cf. fig. 1). An additional character is provided by the stipules surrounding the inflorescence, which are much more deeply and narrowly lobed in *A. microcarpa* than in *A. arvensis*; the lobes in *A. microcarpa* are typically finger-like, whilst those of *A. arvensis* are triangular. The whole inflorescence has a different appearance in the two species; in *A. arvensis* the calyx-teeth can usually be seen under a lens projecting beyond the stipule lobes, whereas in *A. microcarpa* the lobes normally exceed and cover the whole inflorescence.

There also exists a general difference in habit between the two plants, which is sufficiently clear to enable a preliminary sorting of herbarium material to be made, using the habit character only, with considerable success. *A. microcarpa* is commonly a slender plant, with rather long internodes, and the stouter, more vigorous specimens in herbaria almost invariably turn out to be *A. arvensis*. It was in this connection interesting to find the following note attached to a (rather poor) specimen of *A. microcarpa* in Herb. Mus. Brit. collected

in 1853 from Wordwell Common, near Bury St Edmunds, W. Suffolk:—"*Alchemilla arvensis*—much slenderer in growth than the ordinary form, and very distinct in appearance." There is also a slight colour difference which may be associated with hairiness; *A. microcarpa* is usually a pure green, as opposed to the grey-green of *A. arvensis*. Both species vary considerably, however, in these characters of habit and hairiness—a variation presumably largely phenotypic in origin—and too much reliance should not be placed on such characters for identifica-



1. *Aphanes microcarpa*. 2. *Aphanes arvensis*. a. Stipule enclosing inflorescence. b. Single urceole, detached. (Material from Lincolnshire).

tion. As would be expected, specimens with no developed inflorescences present considerable difficulties in determination, and it seems that the stipule character is not reliable in the purely vegetative condition; as, however, the plant is not commonly collected without flowers, herbarium specimens can be identified with little difficulty. A small number of specimens have been found which possess somewhat intermediate fruit and stipule characters, but until cultivation experiments have given some information as to the range of variability within each species, the exact status of such plants cannot be decided.

Gudjonsson (1941) investigated the cytology of the two species in Denmark, and found 2n = 16 for *A. microcarpa*, whilst a count for *A. arvensis* gave 2n = 48, agreeing with Böös' determination of n = 24 for *A. arvensis*. It should be noted, however, that both Murbeck (1901) and Strasburger (1904) had found n = 16 for *A. arvensis*; and Gentscheff and Gustafsson (1940) give 2n = 49-50. In a recent paper, Gustafsson (1948) states that *A. microcarpa* " is sexual and diploid " with 2n = c. 16, whilst *A. arvensis* " is polyploid with 2n = c. 48 but reproduces agamospermously." Further cytological work seems highly desirable.

The data so far accumulated for the distribution of the two species in the British Isles suggests rather strongly that, as Gudjonsson showed for Denmark, *A. microcarpa* is more or less restricted to acid soils, whilst *A. arvensis* appears to be indifferent to soil acidity. Thus all herbarium material yet seen from Cambs. (v.-c. 29), which has very little acid soil, is *A. arvensis*, whilst *A. microcarpa* and *A. arvensis* are both common on acid sandy soils around Lincoln (v.-c. 54). The vice-comital distributions are, of course, as yet very incomplete, and much more information on the occurrence of the two species is required; detailed studies of mixed populations would be particularly interesting in that they may show ecological differences.

Vice-Comital Distribution.

Most of the records are from the following herbaria: British Museum (Natural History) (B), Cambridge (C), Kew (K), Oxford (O). No attempt has been made to cite the earliest record for each v.-c.

Aphanes arvensis L.

V.-c. 1. W. Cornwall; Padstow, *E. Thurston*, 1918, (K).
3. S. Devon; East Allington, near Totnes, in light arable field with *A. microcarpa*, *S. M. Walters*, 1948.
4. N. Devon; Saunton Sands, *L. H. Pegler*, 1922, (B).
6. N. Somerset; Clevedon, *W. H. Painter*, 1881, (B).
9. Dorset; Swanage, *H. N. Ridley* and *W. Fawcett*, 1882, (B).
10. I. of Wight; Shanklin, *H. Trimen*, 1860, (B).
11. S. Hants.; Lyndhurst, *S. H. Bickham*, 1900, (C).
12. N. Hants.; Basingstoke, *R. S. Hill*, 1860, (K).

15. E. Kent; Grove Wood, Darland, Gillingham, *J. B. Marshall*, 1938, (B).
17. Surrey; West Farleigh, Mickleham, *J. F. Young*, 1835, (B).
18. S. Essex; near Chingford, 1884, (Herb. Marshall, C.).
20. Herts.; Watford, *T. Moore*, 1847, (B).
21. Middlesex; Newington, *E. Ballard*, 1839, (B).
22. Berks.; Boar's Hill, *G. C. Druce*, 1893, (O).
23. Oxford; several sheets, (O), e.g., dry field near Headington Wick, *H. Baker*, 1893.
24. Bucks.; High Wycombe, *M. A. Lawson*, 1866, (O).
25. E. Suffolk; Southwold, *Julia Grubbe*, 1879, (K).
26. W. Suffolk; Cavenham, fallow field, *A. J. Wilmott*, 1911, (B).
27. E. Norfolk; Sprowston, *E. F. Linton*, 1885, (B).
29. Cambs.; several sheets, (C), e.g., Gog-Magog Hills, 1826: Newmarket Heath, 1827, *J. S. Henslow*.
30. Bedford; Studham, *E. Milne-Redhead*, (5533). (K).
32. Northants.; near Kingsthorpe, *M. Shepard*, 1873, (B).
34. W. Gloucester; Tutshill, near Chepstow, *E. S. Marshall*, 1908, (C, B).
35. Monmouth; near Windcliff, *H. W. Monington*, 1889, (B).
36. Hereford; Tedstone Delamere, *T. S. Lea*, 1890, (B).
38. Warwick; Milverton, Leamington, *C. Bailey*, 1879, (B).
41. Glamorgan; Rhossili, Gower, *H. J. Riddelsdell*, 1910, (B).
42. Brecon; Cefn, *H. J. Riddelsdell*, 1903, (B).
54. N. Lincs.; fresh material from Holton-le-Moor, with *A. microcarpa*, *Miss E. J. Gibbons*, 1948.
55. Leicester; *J. G. Gillman*, 1931, (B).
57. Derby; Dovedale, *A. J. Wilmott*, 1933, (B).
58. Cheshire; Bowden, *S. H. Bickham*, 1857, (C).
60. W. Lancs.; Aldcliffe, *H. B. Fielding*, 1834, (O).
62. N.E. York; near Ganthorpe, *J. F. Young*, 1845, (B).
63. S.W. York; Sheffield, *W. Newbould*, 1834, (B).
64. M.W. York; Roundhay, Leeds, *A. E. Bradley*, 1902, (B).
66. Durham; near Sunderland, *E. Backhouse*, (B).
68. Cheviotland; Ross Links, *H. E. Fox*, 1885, (O).
69. Westmorland; Arnside, *W. C. Worsdell*, 1894, (K).
81. Berwick; (? loc.) *J. Anderson*, (B).
83. Edinburgh; near Balerno, *Bayley Balfour*, 1871, (O).
86. Stirling; grassy bank below Stirling Castle, *J. F. Duthie*, 1875, (B).
93. N. Aberdeen; near Peterhead, *Brand*, 1833, (B).

S. Jersey; St Aubins and First Tower, *Lester-Garland*, 1899 (K): Alderney; Mannaz Quarry, *Jackson* and *Airy Shaw*, (143), (K).

H.39. Antrim; Bushmills, 1881, *Herb. T. B. Cartwright*, (O).

APHANES MICROCARPA (B. et R.) Rothm.

V.-c. 2. E. Cornwall; St Stephen's, *T. R. A. Briggs*, 1871, (B).
3. S. Devon; East Allington, near Totnes, with *A. arvensis* (q.v.).
6. N. Somerset; Keynsham, Bristol, *H. S. Thompson*, 1922, (B, C).
9. Dorset; Verwood, *E. F. Linton*, 1897, (B).
10. I. of Wight; Alum Bay, *H. E. Fox*, 1910, (O).
11. S. Hants.; Bournemouth, *C. E. Palmer*, 1904, (O).
12. N. Hants.; Shortheath, Selborne, *J. Vaughan*, (O).
13. W. Sussex; Midhurst, *H. E. Fox*, 1875, (O).
17. Surrey; Chart Park, near Dorking, *A. J. Wilmott*, 1914, (B).
21. Middlesex; Hounslow Heath, *J. H. Morgan*, 1894, (B).
23. Oxford; Nettlebed Common, *A. French*, 1876, (B).
24. Bucks.; gravel pit, Burnham Beeches, *A. P. Conolly*, 1945, (fide T. G. Tutin; Herb. Univ. Coll. Leicester).
26. W. Suffolk; Icklingham, *A. J. Wilmott*, 1929, (B).
28. W. Norfolk; Sandringham, light sandy soil, open places in woods, *C. E. Hubbard*, (K).
34. W. Gloucester; Chase End Hill, *H. J. Riddelsdell*, 1909, (B).
37. Worcs.; open woodland track near R. Severn, Bishop's Wood, *Miss E. J. Gibbons*, 1949.
42. Brecon; Nant Gwyllt, *A. Ley*, 1881, (B).
49. Caernarvon; Dinas Dinorwic, *C. C. Babington*, 1847, (C).
54. N. Lincs.; fresh material with *A. arvensis* (q.v.).
55. Leicester; Groby Pool, *T. G. Tutin* (fide T. G. Tutin; Herb. Univ. Coll. Leicester).
58. Cheshire; Oxton Common, *J. S. Henslow*, (C).
60. W. Lancs.; Aldcliffe, *H. B. Fielding*, 1834, (O).
62. N.E. York; Pilmoor, *T. J. Foggitt*, 1934, (B).
63. S.W. York; Doncaster Moor, waste ground, *T. J. Foggitt*, 1908, (B).
71. I. of Man; Gat-y-Whing, Andreas, *C. I. Paton*, 1927, (B).
73. Kirkcudbright; Kempleton Road, Tongland, *F. R. Coles*, (B).
75. Ayr; " waysides, Ayrshire," *Herb. H. E. Fox*, (O).
83. Edinburgh; fields, Water of Leith, *J. F. Young*, (B).
90. Forfar; Kinnordy, *Lyell*, (B).
91. Kincardine; Kingcausie, *J. B. Syme*, 1850, (B).
92. S. Aberdeen; Crathie, Braemar, *A. Croall* (Plants of Braemar, 518), 1856, (C).
96. Easterness; Kincraig, *A. Somerville*, 1891, (B).
97. Westerness; Glen Roy, *G. C. Druce*, 1891, (O).
103. Mid Ebudes; Strongalsh, Mull, *G. Ross*, 1876, (B).
105. W. Ross; Strome Ferry, *E. F. Linton*, 1884: Erradale in Gairloch, *A. J. Wilmott*, 1936, (B).
107. E. Sutherland; near Dornoch, *A. J. Wilmott*, 1919, (B).
112. Shetland; Sandwick, *W. H. Beeby*, 1896, (B).

S. Jersey; sandhills north of Le Ouainé, *A. J. Wilmott*, 1933, (B).
H2. N. Kerry; Killarney, roadside between Muckross and Brickeen, *H. N. Ridley*, 1883, (B).
H16. W. Galway; Roundstone, *C. Bucknall*, (K).

The following plants possess somewhat intermediate characters, and could not be satisfactorily classified:—

V.-c. 17. Surrey; Kingston Vale, cultivated ground, *H. E. Fox*, 1913, (O).
36, 37. Hereford and Worcester; "N. end of Malverns," *A. J. Wilmott*, 1912, (B).
43. Radnor; Stanner Rocks, *A. J. Wilmott*, 1932, (B).
96. Easterness; Cannich, *A. J. Wilmott*, 1936, (B), (*A. arvensis* ?).
109. Caithness; near site of Loch Durran, *A. J. Wilmott*, 1935, (B), (*A. arvensis* ?).
111. Orkney; border of oatfield, Mainland, *H. H. Johnston*, (4079), (several herbaria), (*A. microcarpa* ?).

Note.

The case for retaining *Aphanes* L. (1753, *Sp. Plant.*, ed. 1, 123) as a separate genus from *Alchemilla* L. is stated at length in Hylander and Rothmaler's paper (1937), where a historical review of the different treatments is also given. Rothmaler himself originally treated *Aphanes* as a subgenus of *Alchemilla* (Rothmaler, 1935), a treatment which I followed for an arrangement of the British species of *Alchemilla* (1948); but he later (1937) raised *Aphanes* to its original status of a separate genus. I have decided to follow Rothmaler's later decision in view of the very considerable differences between *Aphanes* and *Alchemilla* proper. Of these differences, the most important are the characters of the androecium, which in *Aphanes* consists of a single stamen with extrorse anther inserted on the inner margin of the disk opposite a sepal, whilst in *Alchemilla* there are four stamens with introrse anthers inserted on the outer margin of the disk and alternating with the *sepals*. In addition, the weak annual habit of *Aphanes* contrasts sharply with the perennial rhizomatous habit of *Alchemilla*.

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STRASBURGER, E., 1904, Die Apogamie der Eualchemillen . . . *Jahrb. f. wiss. Bot.*, **41**.

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ABSTRACTS FROM LITERATURE

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SYSTEMATIC, Etc.

13. Delphinium. Hylander, N., 1945, Några anmärkninger om de som prydnadsväxter odlade arterna av Delphinium undersläktet Consolida, *Bot. Not.*, 75-80, contributes some observations on the cultivated species of *Delphinium* subgenus *Consolida*. He retains the names *D. orientale* and *D. Ajacis*, as understood by J. Gay, and rejects Wilmott's proposition to transfer the name *D. Ajacis* to *D. orientale* and substitute for *D. Ajacis* sec. Gay the new name *D. Gayanum*.—[A.E.W.]

35. Nasturtium. Airy Shaw, H. K., 1947, *Kew Bull.*, *1947*, 39-46, gives reasons for concluding that the earliest name for the wild tetraploid watercress (*N. uniseriatum* Howard & Manton, 1946) is *N. microphyllum* Boenningh. ex Reichb. (1832). An account of the conspecific *Dictyosperma Olgae* Regel (1882) is also given. The known extra-British distribution of the wild tetraploid includes Europe, Afghanistan, Africa and North America. The paper concludes with a translation of a paper by Th. Irmisch (1861) giving details of the diploid and tetraploid under the varietal names *brevisiliqua* and *longisiliqua*.—[H.K.A.S.]

98. Lychnis. Baker, H. G., 1948, Stages in Invasion and Replacement demonstrated by Species of Melandrium, *Journ. Ecol.*, *36*, 96-119. The author considers that *M. dioicum* colonized the British Isles by natural means, and that *M. album* was spread as a follower of agriculture. The most convenient character by which hybrids between the two species can be recognised is the length of the calyx-teeth. *M. dioicum* ranges from 2 to 2.8 mm. and *M. album* 4.5-6.0 mm. Sterility of pollen grains, direction of capsule teeth, capsule size and shape, pedical length and position of leafy stolons are also useful.—[A.H.G.A.]

98. Lychnis. Baker, H. G., 1948, The Ecotypes of Melandrium dioicum (L. emend.) Coss. & Germ., *New Phyt.*, *47*, 131-144. Four distinct ecotypes are described, among them a woodland ecotype corresponding with *M. dioicum* subsp. *villosum* (Compt.) H. G. Baker and a coastal (in the Shetlands) corresponding with subsp. *zetlandicum* (compt.) H. G. Baker. *M. album* does not occur in the Shetlands.—[A.H.G.A.]

128/3. Erodium cicutarium (L.) Hérit. Andreas, Ch. M., 1947, De inheemsche Erodia van Nederland, *Ned. Kruidk. Arch.*, *54*, 138-231. The spotted (*E. pimpinellifolium*) and unspotted inland plants are lumped together. *E. Lebelii*, *E. neglectum* and *E. Ballii* are not recorded from Holland. The specific rank of *E. glutinosum* is confirmed.

It has a different chromosome number (2n=20) from *E. cicutarium* (2n=40), and forms a sterile hybrid, which was found wild. *E. dentatum* Dum. is placed under *E. glutinosum*. The species and subspecies are separated as follows:—

(a) Mature plant entirely or almost without beaks to the fruits; inflorescence usually 5-flowered; flowers purple, usually rather small (9-10 mm., rather larger at the beginning of the year), spotted; anthers often yellow and withered. On the dunes. Rather rare. ... ×*E. anaristatum* Andreas.

(aa) Mature plants with many fruits:

(b) Inflorescence 5-7-flowered; flowers purple or white, usually with a spot on some of the petals; beaks of the fruits 25-35 mm. long; carpels (without beaks) about 6 mm. long, with a distinct furrow around the pit of the carpel. Plants of sandy fields and roadsides. Common. (In the western part of the country there are less typical examples, intermediate between this form and subsp. *dunense*). ..... *E. cicutarium* subsp. *arvale* Andreas.

(bb) Inflorescence up to 5-flowered; flowers nearly always unspotted; beaks about 15-28 mm. long; carpels without or with an inconspicuous furrow round the pit. Dunes:

(c) Inflorescence 3-5-flowered; flowers pale purple or white, zygomorphic, large (± 12 mm. in diam.); pollen orange or yellow; beak 22-28 mm. long; carpels (without beaks) 5-6 mm., with an inconspicuous furrow around the pit. Dunes. Common. ..... *E. cicutarium* var. *dunense* Andreas.

(cc) Plants thickly covered with glandular hairs, especially in the upper part, usually with adhering sand-grains; inflorescence usually 2-3-, sometimes 5-flowered; flowers pale rose, very slightly zygomorphic, small (± 7 mm. in diam.); beak 15-24 mm.; carpels less than 5 mm., strongly cuneate at base without furrow round pit. Dunes. Common. ..... *E. glutinosum* Dum.

—[A.H.G.A.]

155/15. Trifolium hybridum L. Juten, G., 1945, *Bot. Not.*, 72-74. A form with abnormal leaves and flowers is described.—[A.E.W.]

178/4. Lathyrus maritimus (L.) Bigel. Cedergren, K., 1947, Lathyrus maritimus (L.) Bigelow i Skandinavien, *Svensk Bot. Tidskrift*, *41*, 151-158. There are two subspecies—subsp. *glaber* (Ser.) C. Regel and subsp. *pubescens* (Hartm.) C. Regel (= ? var. *aleuticus* (Greene) Fernald). The glabrous one has a southern distribution and the pubescent a northern range. Both are found in Scandinavia. The glabrous subspecies was recorded from Portland by Regel (1935, Fedde *Rep. Sp. Nov.*, *38*, 58), and from Kent by Fernald (1932, *Rhodora*, *34*, 182).—[A.H.G.A.]

185. Rubus. Watson, W. C. R., 1947, The Brambles of Bedfordshire, *Journ. Beds. N.H.S.*, *1*, 21-25. 73 species most of which were found by Watson in 1946 and 1947, are listed. The list contains *Rubus Libertianus* Weihe which had been found in Britain before but is not included in Watson's list (1946, *J. Ecol.*) and *R. luteistylus* Sud., *R. Schlechtendalii* Weihe and *R. pubescens* Weihe, species new to Britain.—[J.G.D.]

190. Alchemilla. Walters, S. M., (1948, *Naturalist*, 1948, 41-43), with a view to encouraging northern botanists to look at the microspecies of *Alchemilla vulgaris* L. agg., contributes a paper containing

a key to these species. Their ecology and distribution is discussed but the author, who is preparing an account for the Biological Flora, seeks further information and asks for the opportunity of seeing material which cannot be identified by the key.—[F.A.S.]

210/1. COTYLEDON UMBILICUS-VENERIS L. Uhl, C. H., 1948, Cytotaxonomic Studies in the Subfamilies Crassuloideae, Kalanchoideae and Cotyledonoideae of the Crassulaceae, *Amer. Journ. Bot.*, *35*, 695-705. *Umbilicus* DC. has about 16 species ranging from the Cape Verde Islands to Britain. The segregation of *Umbilicus* and *Cotyledon* is strongly supported by the cytological evidence. In a plant from the mountains south of Marrakech, Morocco, doubtfully referred to *U. pendulinus* DC., the number is given as n=24.—[A.H.G.A.]

211/22. SEDUM ROSEA (L.) Scop. Fernald, M. L., 1947, Sedum Rosea, not S. roseum, *Rhodora*, *49*, 78-80. The author argues that to write the trivial with a small letter would " wholly misrepresent the truth," and make it look like a feminine adjective and not a generic name.—[A.H.G.A.]

339. AMBROSIA. Vignolo-Lutati, F., 1948, Una nuova località piemontese per Ambrosia elatior L. e la distribuzione ligure-piemontese del genere Ambrosia, *Nuov. Giorn. Bot. Ital.*, *55*, 158-160. *A. elatior* L. (*A. artemisiifolia* Auct. non L.) is a North American species now naturalised in Germany, England, Belgium, Holland, France and Italy. *A. artemisiifolia* L. is not found in Europe. *A. coronopifolia* Torr. & Gray, which has also been confused with *A. artemisiifolia*, is recorded from Italy, as are *A. psilostachya* DC. and *A. trifida* L. *A. tenuifolia* Spreng. is adventive in France, Germany, Holland and Italy. —[A.H.G.A.]

380/1. PETASITES HYBRIDUS (L.) G., M. & S. Valentine, D. H., (1947, *N.W. Nat.*, *22*, 111-114), publishes a further note with reference to the distribution of the sexes of this plant in the North-west of Britain. More information is wanted by the author for his account in the Biological Flora.—[F.A.S.]

380/1. PETASITES HYBRIDUS (L.) G., M. & S. Ilien, Gösta, (1945, Bidrag till Skånes Flora. Förekomsten av Petasites hybridus i Skåne, *Bot. Not.*, 181-303), gives an account of the distribution in Scania, Sweden.—[A.E.W.]

423. TARAXACUM. Haglund, Gustaf E., 1946, Zur Taraxacum-Flora der Insel Öland, *Bot. Not.*, 335-363. A number of new species and forms are described.—[A.E.W.]

423. TARAXACUM. Fernald, M. L., 1948, The Name Taraxacum officinale, *Rhodora*, *50*, 216. The author points out that *T. officinale* Weber (1780) is correct, and not *T. vulgare* (Lam.) Schrank (1792), as Lamarck's *Leontodon vulgare* (1778) was a nomen abortivum.—[A.H.G.A.]

427. SONCHUS. Lewin, R. R., 1948, Sonchus L., *Journ. Ecol.*, *36*, 203-222. (Biological Flora).

445/1. Calluna vulgaris L. 104, N. Ebudes (Skye). A stem of heather, one branch of which bore flowers of the usual purple colour, the other pure white flowers, is reported by Gilmour, J. S. L., (1947, *J. Roy. Hort. Soc.*, *72*, iv). The sport has been recorded before (1920, *Kew Bulletin*, 221).—[D.P.Y.]

460. Primula. Valentine, D. H., 1947, Studies in British Primulas. I. Hybridization between Primrose and Oxlip, *New Phyt.*, *46*, 229-253. Among characters are given intermediate leaf-shape, pedunculate inflorescence, calyx teeth longer than oxlip, capsule exceeding calyx, shaggy indumentum on pedicels as in primrose.—[A.H.G.A.]

515. Cuscuta. Verdcourt, B., 1948, Cuscuta L., *Journ. Ecol.*, *36*, 356-365. (Biological Flora).

532/26. Linaria Cymbalaria (L.) Mill. Cufodontis, G., 1947, Die Gattung Cymbalaria Hill, *Bot. Notiser*, *1947*, 135-156. *Cymbalaria muralis* forma *Seguieri* (Beg.) Cuf., with white flowers, is recorded from Forfar: Broughty Ferry, Corstorphine (a specimen at the British Museum is labelled var. *pallidior* (Rouy)). The forma *glechomifolia* (Chev.) Cuf. is widespread in France and considered likely to occur elsewhere. It has the basal lobe of the leaves touching instead of widely divergent as in the typical form. The var. *pilosa* (Vig.) Degen. with pubescent adult leaves and stems has been found wild near Paris.—[A.H.G.A.]

560. Origanum. Webster, H. N., 1948, Notes on the Marjorams, *The Herbarist*, No. 14, 19-22. *Origanum vulgare* L. was cultivated by the American colonists and used for tea. It is now found as an escape in New England. In addition, there is an extremely aromatic, bushy, white-flowered variety identified as *O. vulgare* var. *virens*, probably introduced from Greek or Italian gardens. Also a rose-coloured form, not as robust as the typical species, with the foliage paler green, with soft, thin leaves and flat-topped inflorescence. It has not yet escaped, and resembles winter marjoram (*O. heracleoticum*) in some respects. Another kind is a strong woody herb, with long inflorescences with deep red bracts and fragrant purple flowers. It resembled var. *prismaticum*, which should apparently have white flowers. Pot marjoram (*Majorana onites*) and sweet marjoram (*M. hortense*) are quite different plants of annual habit.—[A.H.G.A.]

561. Thymus. Jalas, J., 1947, Zur Systematik und Verbreitung der Fenno-Skandischen Formen der Kollektivart Thymus Serpyllum L., em. Fr., *Acta Botanica Fennica*, *39*, 3-85. The writer separates the species and subspecies as follows:—

(a) Leaves with a thick, white-felted pubescence on the under surface; erect, shrubby perennial with woody branches. Occasionally planted or escaped ..... *T. vulgaris* L.

(aa) Leaves glabrous or hairy, but pubescence not felted; ± prostrate herbs or shrubby perennials with only slightly woody branches.

(b) Stems strongly 4-angled, hairy only on the angles (goniotrichous). Plants of erect growth. Main stem always terminated by an inflorescence. Sterile runners either wanting (Sect. *Suberecti* Vel.), or growing out from the branches of the main stem .....
(Sect. *Pseudorepentes* Vel.). *T. pulegioides* L.

(bb) Branches only slightly angled or almost terete, not goniotrichous:
(c) Plant of erect growth. Sterile runners wanting (Sect. *Suberecti* Vel.). Flowering axis about 20 cm. long. Leaves oblong to linear, usually over 15 mm. long, finely veined. Inflorescence elongate. Occasional as an escape ..... *T. Marschallianus* Willd.
(cc) Plant of creeping habit. Main stem usually grows out into a sterile runner (Sect. *Repentes* Vel.). Flowering axis rarely more than 15 cm. long. Leaves up to 15 mm. long with conspicuous veins on the under surface. Inflorescence usually thick, ± clavate ..... *T. Serpyllum* L. em. Fr.
(d) Flowering branches with two lines of hairs. Leaves 5-7-nerved, small, thick, with conspicuous veins on the under surface. ..... Subsp. *arcticus* (Dur.) Hyl.
(dd) Flowering branches hairy all round (holotrichous), or only partially with two lines of hairs (subgoniotrichous).
(e) Flowering branches usually subgoniotrichous. The lower bracts greatly exceeding the flowering branches. Leaves 7-9-nerved. ... Subsp. *tanaënsis* (Hyl.) Jalas.
(ee) Flowering branches usually holotrichous. Leaves and lowest bracts of the same size and shape. Leaves usually 7-nerved. ..... Subsp. *angustifolius* (Pers.) Vollm.

The subsp. *angustifolius* has four varieties:—

(f) Leaves small, 3-5 mm. long. Internodes of stem usually short, their leaves overlapping. ..... Var. *ericoides* Wimm. & Grab.
(ff) Leaves 5-10 mm. long. Internodes of stem longer:
(g) Flowering axis robust, with patent glands in the upper part. Main stem often terminated by an inflorescence. ... Var. *rigidus* Wimm. & Grab.
(gg) Flowering axis slender, with glandular hairs:
(h) Leaves oblong-elliptic to obovate, 2½ to 3½ times as long as broad. ..... Var. *Linneanus* Gren. & Godr.
(hh) Leaves oblong-linear to linear, 4-6 times as long as broad. ..... Var. *lineatus* Endl.

T. pycnotrichus (Uechtr.) Ronn. is reduced to *T. Serpyllum* subsp. *angustifolius*, which is recorded from the British Isles and the Faeroes, as well as from northern Europe generally. Two forms are made:—f. *ciliatus* Jalas and f. *hirsutus* Jalas. The form *lanuginosus* Mill. with hairy undersurface is rare in Scandinavia, and there are also completely glabrous examples (f. *glabratus* Wimm. & Grab.). No British records are given for var. *Linneanus*, var. *lineatus* or var. *rigidus*. Subspecies *tanaënsis* is restricted to northern Scandinavia. It has been confused with *T. Drucei* Ronn., which, with *T. neglectus* Ronn. and *T. britannicus* Ronn., is referred to subspecies *arcticus* (Dur.) Hyl., which is given for Scandinavia, Faeroes, Iceland, Greenland and rare in the British Isles. There are good illustrations and the nomenclature is discussed. Chromosome numbers are quoted with some doubt as 2n=54 for *T. britannicus* (and *arcticus*), 2n=24 for subsp. *angustifolius*.—[A.H.G.A.]

561. THYMUS. Jalas, J., 1948, Chromosome Studies in Thymus I, *Hereditas, 34*, 414-434. The following chromosome numbers (among others) are given:—*T. Drucei* 2n=54, *T. Serpyllum* subsp. *angustifolius* 2n=24, *T. pulegioides* subsp. *eu-pulegioides* 2n=28, *T. vulgaris* 2n=30. *T. Drucei* Ronn. emend. Jalas (*T. Serpyllum* subsp. *arcticus* (Dur.) Hyl.) is now regarded as a species distinct from *T. Serpyllum*, contrary to the author's earlier opinion.—[E.F.W.]

561/1×4. THYMUS PULEGIOIDES L. × SERPYLLUM L. Jalàs, J., 1947, Thymus pulegioides L. × T. Serpyllum ssp. angustifolius (Pers.) Vollm. (*T. oblongifolius* Opiz, non H. Braun), ein für Ostfennoskandien neuer Bastard, *Mem. Soc. Fauna Fl. Fenn., 23*, 151-154. The occurrence of this hybrid in Finland is reported.—[E.F.W.]

588/8. PLANTAGO LANCEOLATA L. Snyder, W. E., 1948, Mechanism of the Photoperiodic Response of Plantago lanceolata L., *Amer. Journ. Bot., 35*, 520-525. Ribwort plantain is a long-day plant developing flowers when exposed to 15 or more long days, or to 9 or more days of continuous illumination. Plants have been kept for over 14 months in the vegetative condition by continuous exposure to short-day conditions.—[A.H.G.A.]

633. ULMUS. Ciferri, R., 1948, Qualche dato per una revisione degli Olmi italiani, *Arch. Bot., 24*, 67-72. *U. carpinifolia* Gled. is frequent, *U. montana* Stokes is frequent in northern and central Italy, but ×*U. vegeta* (Loudon) Schneider seems to be commoner; it is planted in parks and streets. ×*U. hollandica* (Miller) Moss is rarer. The third kind cultivated in Italy is "*U. minor* Miller," which is found in southern Italy and Sicily, where it is the commonest species. ×*U. stricta* Lindl. is scarce and *U. procera* Salisb. has not been recorded.—[A.H.G.A.]

637. URTICA. Selander, S., 1947, Urtica gracilis Ait. in Fennoscandia, *Svensk Bot. Tidskrift, 41*, 264-282. *Urtica dioica* L. [as *dioeca*] subsp. *gracilis* (Ait.) Selander has been known in Scandinavian literature as *U. dioica β glabra* Hartm. (1832). The writer considers that it is conspecific with *U. gracilis* Ait. from North America. It is commonly monoecious and differs from var. *subinermis* Uechtritz (1863), which is a glabrous form of *U. dioica*. The plant is montane and has broad leaves and coarse, not stinging, hairs on the stem.—[A.H.G.A.]

637. URTICA. Greig-Smith, P., 1948, Urtica L., *Journ. Ecol.*, 1948, *36*, 339-355. (Biological Flora.)

642. BETULA. Lindquist, B., 1947, On the Variation in Scandinavian Betula verrucosa Ehrh., with some Notes on the *Betula* Series Verrucosae Sukacz., *Svensk Bot. Tidskr., 41*, 45-71. The chromosomes of *B. verrucosa* Ehrh. and *B. pubescens* Ehrh. [the author does not use the name *B. alba* L. for either] have been counted. The former has 2n=28 and the latter 2n=56. Intermediate forms have been found with 2n=42. Some of the forms with 42 may be autopolyploids of *B. verrucosa*. The main varieties of *B. verrucosa* in Europe are discussed. The plant from the British Isles, Southern Sweden and Central Europe is referred to var. *saxatilis* Lindq., while that of Northern Scandinavia is var. *lapponica* Lindq. Among other characters var. *lapponica* has a much smoother, white bark, and acute buds.—[A.H.G.A.]

642/1. BETULA ALBA L. Johnsson, Helge, 1946, Progeny of triploid Betula verrucosa Ehrh., *Bot. Not., 1946*, 285-290, gives the results of crossing experiments with two triploids.—[A.E.W.]

643. Alnus. Ehrenberg. C. E., (1946, Till frågran: existerar Alnus glutinosa × incana i naturen?, *Bot. Not., 1946*, 329-535), discusses an investigation of the meiosis of *Alnus glutinosa*, *Alnus incana*, and intermediate forms (possible hybrids, growing in the same grove). All forms have 14 bivalents in metaphase I, small irregularities occurring in less than 1% and somewhat more commonly in the intermediate forms than in the pure species. It is suggested that the great uniformity in all the intermediate forms is due to intermediate forms being, not hybrids, but varieties of the pure species (*A. glutinosa* × *incana* has never been produced artificially), or to the chromosomes of the parent species being homologous to a great extent.—[A.E.W.]

646. Quercus. Weimarck, H., (1947, De Nordiska ekarna, I. Quercus Robur subsp. pedunculata och subsp. puberula, *Bot. Not., 1947*, 61-78; II. Quercus petraea och Q. petraea × Robur jämte en systematisk od växtgeografisk överblick, *ibid.*, 105-134), discusses the systematic and geographical distribution of the Scandinavian oaks. The following forms under *Q. Robur* subsp. *pedunculata* are recognised:—f. *brevipedunculata* (Lasch) Schwarz, female catkins short; f. *holophylla* (Rehd.) Schwarz, leaves more or less entire; f. *longipedunculata* (Lasch) Schwarz, female catkins long; f. *petiolens* DC., leaves cuneate at the base, without auricles, petioles 5-15 mm. long. A more or less entire leaved form, forma *mespilifolia* (Wallr.) Weim., of the hybrid *Q. petraea* × *Robur* is dealt with at some length. *Quercus petraea* (Matt.) Liebl. (*Q. sessiliflora* Salisb.) has usually been separated from *Q. Robur* L. by its stellate pubescence. The writer shows that there is also a subspecies of *Q. Robur* with pubescent leaves which is found in Scandinavia. This is subspecies *puberula* (Lasch.) Weim. From the hybrid *Q. petraea* × *Q. Robur* it is distinguished by its fertility. The hybrid is almost sterile.—[A.H.G.A. and A.E.W.]

651. Populus. Rouleau, E., 1948, New Names in Populus, *Rhodora*, *50*, 233-236. The type specimen of *Populus candicans* Ait. proves to be *P. balsamifera* L. The new name ×*P. gileadensis* Rouleau is accordingly proposed for *P. candicans* Auct. (*P. Tacamahacca* sensu Moss 1914, *Cambr. Brit. Fl.*, *2*, 13).—[A.H.G.A.]

668. Epipactis. Nannfeldt, J. A., (1946, Tre för Norden nya Epipactis-arter, E. persica Hausskn., E. leptochila (Godf.) Godf. och E. purpurata Sm., *Bot. Not., 1946*, 1-28), records three species new to Scandinavia and gives an extensive review of the literature on *Epipactis* sect. *Euepipactis*. *Epipactis persica* Hausskn. (1927) is stated to be identical with a plant which has passed falsely under various names, and is also stated to be identical with *E. rectensis* (T. & T. A. Steph.) Brooke and Rose (1940), *E. Troodii* Lindb. fil. (1942), *E. viridiflora* f. *acutiflora* Krösche, *E. latifolia* f. *gracilis* Dageförde, and probably also with *E. latifolia* subsp. *viridiflora* var. *dilatata* Graber. Its distribution extends from France and England in the West to Iran in the East. *E. persica*, *E. leptochila* and *E. purpurata* are illustrated by photographs.—[A.E.W.]

669/1. Orchis purpurea Huds. Rose, F., 1948, Orchis purpurea Huds., *Journ. Ecol.*, *36*, 366-377. (Biological Flora).

669. Orchis. D'Alleizette, M., 1947, Au sujet de l' ×Orchis Nummiana P. Fourn. de St Nom-la-Brerèche, *Bull. Soc. Bot. France*, *94*, 102-104; Senay, P., A propos d'hybrides d'Orchis, *ibid.*, 249-250. A putative hybrid between *O. elodes* [=*O. ericetorum* (Linton) E. S. Marshall] and *O. latifolia* [probably *O. majalis* Reichb.]. Characters are given separating it from ×*O. Hallii* Druce (*O. elodes* × *O. praetermissa*). Senay in the same journal suggests that *O. Nummiana* P. Fourn. (1931) is the same as ×*O. Hallii* Druce and suggests that d'Alleizette's hybrid is, in fact, *O. maculata* [*O. Fuchsii* Druce] × *praetermissa* (×*O. Mortonii* Druce).—[A.H.G.A. and E.F.W.]

699. Orchis. Vermeulen, P., 1947, *Studies on Dactyorchids*, pp. 180, Utrecht. A well-illustrated preliminary revision of the group. The author gives arguments why *Dactylorchis* should be treated as a separate genus and makes numerous new combinations. The text is in English.—[J.E.L.]

669/7×10. Orchis ericetorum × latifolia. Pettersson, B., 1947. On some Hybrid Populations of Orchis incarnata × O. maculata in Gottland, *Svensk Bot. Tidskr.*, *41*, 115-137. A comparatively tall and large-flowering orchid related to *O. incarnata* L. (*O. latifolia* L. sensu Pugsley) was found in Gottland and named *O. elatior* (Fries) Lönnr. (×*O. ambigua* Kerner). The stem is less hollow than in *O. incarnata* and the spike not as dense.—[A.H.G.A.]

702/11. Allium Schoenoprasum L. Nybom, Nils, 1947, Non-random distribution of chromosomes at meiosis in triploid Allium Schoenoprasum, *Bot. Not.*, *1947*, 55-60.

729. Alisma. Tschermak, Uvess E., 1948, Zytologische Untersuchungen an den Alisma Arten der Umgebung Wiens, *Österr. Bot. Zeitschr.*, *95*, 270-275. *Alisma Plantago-aquatica* and *A. gramineum* are shown to have a chromosome number 2n=14, while *A. lanceolatum* from near Vienna and from Denmark has 2n=26, and is apparently allopolyploid.—[A.H.G.A.]

738. Ruppia. Setchell. W. A., 1946, The Genus Ruppia, *Proc. Calif. Ac. Sc.*, *series 4*, *25*, No. 18. After 15 years' cultivation, two species were recognised, *R. maritima* L. with short, non-spiral peduncles, and *R. spiralis* Dumort. with elongated, spiral peduncles.—[A.H.G.A.]

738. Ruppia. Luther, H., 1947, Morphologische und Systematische Beobachtungen an Wasserphanerogamen, *Acta Bot. Fenn.*, *40*, 3-26. Among other genera, *Ruppia* is keyed out as:—1. Leaves about 1 mm. broad, with rounded apex. *R. spiralis*. 2. Leaves about ½ mm. broad, acuminate or with an irregularly lacerate apex. *R. rostellata*, *R. brachypus*. These differences are illustrated on p. 19. The leaves of *R. spiralis* are dark green, relatively stiff and over 1 mm. broad. The leaves of the other species are more delicate.—[A.H.G.A.]

753. CAREX. Hjelmquist, H., and Nyholm, E., (1947, Några anatomiska artkaraktärer inom Carex-gruppen Distigmaticae, *Bot. Not.*, *1947*, 1-31), discuss the leaf anatomy in the group *Distigmaticae* of *Carex* in Scandinavia. Characters of value in determination have been found. The main differences are illustrated by transverse sections of the leaves. The species dealt with are *C. caespitosa* L., *C. elata* All., *C. fusca* All., *C. trinervis* Degl., *C. gracilis* Curt., *C. rufina* Drej., *C. Bigelowii* Torr., *C. aquatilis* Wahl., *C. recta* Boott, *C. halophila* F. Nyl., *C. subspathacea* Wormskj., *C. salina* Wahl., *C. paleacea* Wahl., and the hybrids including *C. aquatilis* × *elata*, *C. aquatilis* × *gracilis* and *C. aquatilis* × *salina*. Anatomically different geographical forms have been found especially in *C. paleacea*.—[A.E.W.]

753/59(2). CAREX VULPINA L. sec. Nelmes. Naustdal, J., 1947, Carex vulpina L. ny for Norge, *Blyttia*, *5*, 7-12. The writer records the species and compares it with *C. Otrubae* Podp.—[A.H.G.A.]

754/10. PANICUM SANGUINALE L. Brown, W. V., 1948, A Cytological Study in the Gramineae, *Amer. Journ. Bot.*, *35*, 382-395. The chromosome number was found to vary among individual plants of *Digitaria sanguinalis* growing together. These may be interfertile polyploid plants.—[A.H.G.A.]

797/1. CYNODON DACTYLON (L.) Pers. Hurcombe, R., 1947, A Cytological and Morphological Study of Cultivated Cynodon species, *Journ. South African Botany*, *13*, 107-116. The chromosome number indicated that the basic number of the genus is 10 and that the species form a polyploid series, in which *C. transvaalensis* Burtt-Davy (Transvaal) is the diploid form, ×*C. Magennisii* Hurcombe the triploid (a hybrid between *C. transvaalensis* and *C. dactylon*), and *C. dactylon* Pers. and *C. dactylon* var. *densus* Hurcombe (Hall's selection), both tetraploid forms. The basic number was given as 9 by previous authors. The cosmopolitan species is *C. dactylon* Pers.—[A.H.G.A.]

777/4. PHLEUM ARENARIUM L. Af Rantzien, H. H., 1946, Taxonomical and Phytogeographical Studies in Phleum arenarium L., *Bot. Not.*, *1946*, 364-386), gives an account of the taxonomy and distribution. *P. arenarium* shows little variation, and with the exception of ssp. *aegaeum* Vierh. no isolated populations of taxonomic or geographical significance seem to have been developed. The centre of distribution is in the dunes of oceanic Western Europe. "From eu-oceanic region on the Atlantic coast of Central Europe the distribution enters to the north and south the sub-oceanic and eury-oceanic regions, where it gradually becomes more split up. Consequently the distribution in Northern Europe has a strong S.W. character." The distribution type can be described as a Mediterranean and Atlantic one. Ecologically *P. arenarium* is indifferent to salt, and is a pronounced psammophyte with a primary occurrence on sand dunes and areas of drifting sand where stabilisation and concentration of humus have begun in some degree. It is to some extent an adventive, more especially Northern Scandinavia. —[A.E.W.]

824. Poa. Heg. O. A., 1944, Poa supina i Norge, *Blyttia, 2*, 21-24. The writer gives a map of the distribution in Scandinavia, and records a hybrid *P. annua* L. × *P. supina* Schrad.—[A.H.G.A.]

825/3b. Glyceria declinata Bréb. Størmer, P., 1948, Glyceria declinata, New to Norway, *Blyttia, 6*, 40. This plant, recently found in Denmark by S. M. Walters, is now reported from Oslo and from Ytre Sandsvær in Norway.—[A.H.G.A.]

826×829. Festulolium. Camus, A., 1947, Sur deux × Festucololium récoltés dans le sud-ouest, *Bull. Mens. Soc. Linn. Lyon, n.s. 16*, 50-51. ×*Festucololium adscendens* Asch. & Gr. (*Festuca pratensis* × *Lolium perenne*), and ×*F. Braunii* A. Camus (*F. elatior* × *L. italicum*) are recorded. In hybrids the habit usually recalls *Lolium*, but usually some of the lateral spikelets have two glumes as in *Festuca*, with the lower glume often reduced and adaxial, while the upper glumes are abaxial. In *Lolium* all lateral spikelets have one glume, but the terminal has two. The principal axis is less excavated than in *Lolium*. The pollen is usually abortive. In ×*F. adscendens* the lower glume is adaxial and shorter than the upper, the fertile glume is usually muticous. The lower glume is rather scarious. In ×*F. Braunii* the rudimentary lower glume is adaxial, the fertile glume muticous in the lower flowers and aristate in the upper ones. Other hybrids known are: —×*F. Colini* (*Festuca pratensis* × *L. temulentum*), ×*F. Frederici* (*Festuca rubra* × *L. perenne*) and ×*F. Nilssonii* (*Festuca gigantea* × *L. multiflorum*).—[A.H.G.A.]

844/6. Equisetum palustre L. Fernald, M. L., 1947, Equisetum palustre, example of careless bibliography and phytography, *Rhodora, 49*, 278-286. Deals with the correct authorities for the minor variations and forms of the species.—[A.H.G.A.]

847/1. Pteridium aquilinum (L.) Kuhn. Watt, A. S., 1947, Contributions to the Ecology of Bracken (Pteridium aquilinum), *New Phyt., 46*, 97-121.

856/1(2). Dryopteris Borreri Newm. Nordhagen, R., 1947, Dryopteris paleacea (Sw.) C. Chr. og dens utbredelse i Norge, *Blyttia, 1947*, 89-118. [This is the species usually known as *D. Borreri* Newm. in Britain, because it is doubtful if it is really conspecific with *D. paleacea*, a species originally described from Mexico.] *D. Borreri* Newm. differs from sexual *D. Filix-mas* in being apogamous and having a different chromosome number in the vegetative cells. The prothallia occasionally bear antheridia (but never archegonia), and different "strains" with different chromosome numbers are known. A map shows the distribution in Europe, which is compared with that of *Ilex Aquifolium*. There is a most useful plate showing the differences between the two species.

856/1(2). Dryopteris Borreri Newm. Knaben, G., (1948), Kromosomtall og generasjonsveksel hos Dryopteris paleacea (Sw.) C. Chr. i Norge, *Blyttia, 1948*, 17-31 (Chromosome Number and Alternation of Generations of *D. paleacea* in Norway.) It was found that *D. Filix-mas* has unicellular hairs only on the margin of the gametophyte, while

those of *D. Borreri* may be either uni- or multi-cellular. The fronds of third year growth of *D. Filix-mas* have more acutely denticulate segments than those of *D. Borreri*.—[A.H.G.A.]

861. Woodsia. Butters, F. K., and Tryon, R. M., 1948, A Fertile Mutant of a Woodsia hybrid, *Amer. Journ. Bot.*, *35*, 132-133. The hybrid ×*Woodsia Abbeae* (*W. ilvensis* × *W. Cathcartiana*) is normally sterile, but the author's is a wild example with half of the frond fertile. This was allopolyploid and represents a spontaneous development of that state in nature.—[A.H.G.A.]

876/6. Chara tomentosa L. Björkman, S. O., 1947, On the Distribution of Chara tomentosa L. round the Baltic and some Remarks on its Specific Epithet, *Bot. Not.*, *1947*, 157-170.

FLORAS, Etc.

Biological Flora.—There is a list of accounts published or in preparation in *Journ. Ecol.*, (1948), *36*, 198-201. This gives 22 as published and 92 in preparation in July 1948.—[A.H.G.A.]

Russia. Komarov, V. L., 1948, *Flora U.R.S.S.*, *13*, Moscow. This is an important work for students of the European Flora. This volume deals with the Leguminosae from *Oxytropis* to *Glycine*.—[A.H.G.A.]

Scandinavia, etc. Löve, A. & D., 1948, Chromosome Numbers of Northern Plant Species, *Reykjavík Univ. Inst. Appl. Sc., Dept. Agric. Rep.*, Ser. B, No. 3. A complete list of plants growing in Denmark, Finland, the Faeroes, Iceland, Norway and Sweden, with chromosome numbers (most recent counts). The countries in which each plant grows are given and italics are used for counts from material from the area covered. There is an appendix with some new names and combinations and the following new plants—*Ophioglossum vulgatum* var. *islandicum*, *Anthoxanthum alpinum*, *Dactylorchis maculata* ssp. *islandica*.—[E.F.W.]

HISTORY.

Natural History Societies. *The Advancement of Science*, *5*, No. 17 (1948). Dr J. Ramsbottom's address on "The Natural History Society" is printed in this number. The origin and nature of local natural history societies is described. The Botanical Society was founded in 1721, and the Society for Promoting Natural History in 1782. These were London societies. In the provinces societies of a more generalized type were started. Such were the Literary and Philosophical Societies; Edinburgh 1739, Manchester 1781 and Newcastle 1792. Societies were now often organised into groups, and contact between members of different societies served a useful purpose. However, there seemed to be a lack of drive, and the remedy seemed to be organized excursions under expert guidance, so that specimens collected should be correctly named. Local societies should meet on early-closing days, and might associate themselves with the British Legion and Working Men's Clubs. The work most appropriate to local societies is the making of local records. Valuable work has also been done in connection with wild life conservation. The Geographical Association wel-

comes opportunities for collaboration with other societies in the preparation of regional surveys. As regards publications, two different standards have been recommended—$11\frac{1}{2}'' \times 8''$ and $9'' \times 6''$ (Aslib) and $9\frac{3}{4}'' \times 7\frac{1}{4}''$ (Congress of Archaeological Societies). All editors should send a note of new county records to some central body, as these might be overlooked in local publications.—[A.H.G.A.]

The Botanical Magazine. Synge, P. M., (1948, *J. Roy. Hort. Soc.*, *73*, 5-11), describes the history of this publication.—[D.P.Y.]

Dony, J. G., 1947, Bedfordshire Naturalists: I, William Crouch, *Journ. Beds. N.H. Soc.*, *1*, 50-52. A short account of the work of Crouch (1818-46) who was an early Bedfordshire botanist.—[J.G.D.]

Dony, J. G., 1947, Bedfordshire Naturalists: II, James Saunders, *Journ. Beds. N.H. Soc.*, *1*, 58-61. An account of the work of Saunders (1839-1925), author of *Field Flowers of Bedfordshire* (1911), etc.—[J.G.D.]

METHODS OF PLANT COLLECTING.

Hodge, W. H., 1947, The Use of Alcohol in Plant Collecting, *Rhodora*, *49*, 207-210. Discusses the Schwenfurth method of collecting plants in alcohol and drying them afterwards. Formaldehyde may also be used as described by Schultes in the same periodical (p. 54).—[A.H.G.A.]

Howard, R. A., 1947, The Use of D.D.T. in the preparation of Botanical Specimens, *Rhodora*, *49*, 286-288. 100% powdered D.D.T. was found effective in the protection of specimens from insect damage, while collecting.—[A.H.G.A.]

M.C., 1948, Séchage rapide des plantes pour herbiers, *Bull. Mens. Soc. Linn. Lyon*, *n.s.*, *17*, 199. M. Maillefer has a system of drying plants by electricity, which comprises a wooden box with two compartments. The first contains a little electric ventilator, which drives heated air into the second compartment, where the plants are placed, between corrugated cardboard. A weight is placed on the press of plants to take up the slack as drying proceeds. Heat is applied for an hour a day for two days.—[A.H.G.A.]

Mercie, C., 1948, Préparation des collections végétales par dessiccation sous vide, *Bull. Soc. Bot. Franc.*, *95*, 38-43. Plants were dried in a vacuum to retain their colour, and to avoid changing drying papers. This process took a week, and the colours were retained. *Scrophulariaceae*, *Orchidaceae* and *Liliaceae* did not turn black. The apparatus required consists of a vacuum dryer (étuve à vide), and a water-jet injector (trompe à eau), or better still a vane-pump (pompe à palettes). To obtain plants which were not pressed but retained their shape, a bath of hot sand was used in a vacuum. The water vapour given off was taken up by calcium chloride. Unfortunately this method produces unnaturally slender stems. Experiments in dessication at low temperatures are also described. They were particularly valuable for fleshy fungi. [Dr Mercie added in a letter: " L'appareil que j'utilise est très comparable à un autoclave pour stérilisation. C'est une en-

ceinte cylindrique avec couvercle et joint en caoutchouc, dans laquelle je fais le vide, au lieu d'y créer une pression. J'ai fait sonder tout autour un serpentin en cuivre, qui sert d'évaporateur à chlorure de méthyle. Une groupe compresseur avec détendeur et tous les accessoires habituels aux installations frigorifiques, permet de refroidir l'appareil et d'assurer la dessication à basse température ± −10° à −20° environ suivant les objets à traiter."]—[A.H.G.A.]

STEYERMARK, J. A., 1947, Notes on Drying Plants, *Rhodora*, *49*, 220-227. Discusses the use of artificial heat and recommends 24 hours without heat, before placing over a stove between corrugated cardboard.—[A.H.G.A.]

NOMENCLATURE.

AIRY SHAW, H. K., 1947, Typification of New Names derived from Persons or Places, *Kew Bull.*, *1947*, 35-37. The writer considers that where the name of a species embodies the name of a collector, the species should be typified by that specimen, unless it can clearly be shown that the description was based upon other material.—[A.H.G.A.]

FASSET, N. C., 1948, The Proposed Changes in Article 58, *Rhodora*, *50*, 249-252. The American Society of Plant Taxonomists have proposed that the " earliest legitimate name " given to a group shall in all cases be retained for that group when its rank is changed, but that this shall only apply to names published after 1st January 1953. The writer is opposed to the proposed change.—[A.H.G.A.]

FERNALD, M. L., and SCHUBERT, B. G., 1948, Studies of American Types in British Herbaria, *Rhodora*, *50*, 149-175, 181-208. *Impatiens capensis* Meerb. is adopted as the correct name for *I. biflora* Walt. (*I. fulva* Nutt.). Linnaeus included both *Juncus scirpoides* Michx. and *J. nodosus* under his *J. nodosus*, but his *diagnosis* applies better to the latter.—[A.H.G.A.]

RICKETT, H. W., 1948, Orthography in Botanical Nomenclature, *Brittonia*, *6*, 365-368. Suggests that Recommendation XLIV should read:—" When two or more Greek or Latin words are united to form a name or epithet, this should be done as nearly as possible in accord with classical usage. When needed, a connecting vowel may be inserted, *o* in Greek, *i* in Latin; and Latin stems for this purpose should generally be taken as ending in *i*. The original spelling of existing compounds should, however, be retained, except for manifest orthographic or etymological errors."—[A.H.G.A.]

RICKETT, H. W., and CAMP, W. H., 1948, The Nomenclature of Hybrids, *Bull. Torr. Bot. Club*, *75*, 496-501. The author discusses the different kinds of hybrid and species existing in nature, and notes that Article 14 is inadequate. Dr Camp is Secretary of a committee to report on the subject to the International Botanical Congress at Stockholm in 1950. He will be pleased to receive communications on the subject.—[A.H.G.A.]

TOPOGRAPHICAL.

16, W. KENT; 17, SURREY. Prime, C. T., (1948, *Proc. Croydon N.H. Soc.*, *11*, 243-268), discusses the origin and distribution of the flora of

S. England, with special reference to the Croydon Regional Survey area (parts of v.-c. 16 and 17). Adopting Matthews' classification of distributional types, in the Croydon area plants of the Continental Northern group and also the few representatives of the Arctic Alpine, Northern Montane, and Oceanic Northern groups, are largely bog and marsh species and on that account are much restricted in distribution and many are decreasing. The Oceanic W. European group are mainly calcifuges and include several characteristic species of acidic soils; the Oceanic S. European are also mainly confined to acidic soils in the area, but are in general rare. Plants of the Continental type are largely found in dryer areas. The Continental Southern group is well represented, and includes a high proportion of calcicoles and plants of dry habitats. Only 3-4 Mediterranean species occur in the area. The European, Eurasian, and N. Hemisphere types are too widespread to repay study in a restricted area. Six British endemics (excluding species of highly critical genera) occur in the area concerned. The spread of aliens is also discussed.—[D.P.Y.]

17, Surrey; Purley Downs Golf Course and Coulsdon Common. A comparative ecological survey of these two areas, 3 miles apart, is made by Ash, M., (1948, *Proc. Croydon N.H. Soc.*, *11*, 315-329). Purley Downs is mainly on chalk, and has an appreciably lower rainfall and greater exposure to wind than Coulsdon Common, which is chiefly on clay-with-flints. Detailed frequency lists are given, also a table showing relationships between frequency of 32 species and pH of the soil.—[D.P.Y.]

17, Surrey; Croydon District. Blackheath Pebble Areas. Prime, C. T., (1948, *Proc. Croydon N.H. Soc.*, *11*, 269-302), describes ecological studies of several woods and heaths on the Blackheath Beds, especially Worms Heath, Addington Hills, Croham Hurst. Detailed frequency lists for these three areas are given, and compared with the earlier lists made by Parsons (1912, *Proc. Croydon N.H. Soc.*). On Worms Heath, *Calluna* is decreasing at the expense of *Ulex europaea*, *Betula*, *Molinia caerulea*, etc. Here and also on Addington Hills there has been since Parsons' time a decrease in moisture-loving plants owing to progressive drying of the soil and disappearance of boggy spots, and on Addington Hills also *Calluna* has been very largely invaded and displaced by *Betula*. The woodland of Croham Hurst is probably the climax vegetation of this type of soil. The ecological progression of vegetation of the Blackheath beds differs from that of the Greensand soils in the neighbourhood, notably in Callunetum being unstable and eventually giving place to trees, and more resembles that of Bunter sandstones of Sherwood Forest.—[D.P.Y.]

27, E. Norfolk. Lambert, J. M., 1948. A Survey of the Rockland-Claxton Level, Norfolk, *Journ. Ecol.*, *36*, 120-135. The locality is an embanked and drained area in the Yare Valley, south of Rockland Broad.—[A.H.G.A.]

29, Cambs. Rishbeth, J., 1948, The Flora of Cambridge Walls, *Journ. Ecol.*, *36*, 136-148. 186 vascular plants are recorded, including *Papaver atlanticum* (Ball) Cosson.—[A.H.G.A.]

30, Beds. Dony, J. G., (1947, What Bedfordshire Is, *Journ. Beds. Nat. Hist. Soc.*, *1*, 8-12, with map), discusses the limits of Watsonian v.-c. 30, Bedford, in relation to present administrative county, with notes on plant species gained or lost to the vice-county.—[J.G.D.]

30, Beds. Dony, J. G., and Piercey, K., 1948, Nature Reserves: A Report on the Situation in Bedfordshire, *Beds. Naturalist*, *2*, 19-21.

49, Caern. Wilson, A., (1947, *N.W. Nat.*, *22*, 62-63 + 1 plate), continues his Flora of a Portion of North-east Caernarvonshire. The list of species has now reached the *Gramineae*.—[F.A.S.]

61-5, Yorks. Cheetham, C. A., (*Nat.*, 1948, The Yorkshire Naturalists' Union Eighty-Sixth Annual Report, 23-24) gives a report on botany for 1947.—[F.A.S.]

96, Easterness, etc. Watt, A. S., and Jones, E. W., 1948, The Ecology of the Cairngorms, *Journ. Ecol.*, *36*, 283-304.

H 9, Clare. Webb, D. A., 1947, The Vegetation of Carrowheel, *Journ. Ecol.*, *35*, 105-129. (N.W. Clare).

MISCELLANEOUS.

Chenery, F. M., 1948, Aluminium in Plants and its Relation to Plant Pigments, *Ann. Bot. N.S. 12*, 121-136. Certain plants accumulate aluminium. There are often species with blue flowers and blue fruits, e.g. *Hydrangea macrophylla*. The pink flowers of *Hydrangea* will change to blue if transferred to a more acid soil, or after treatment of the soil with aluminium salts. Such plants have delphinidin flower pigment. In aluminium-accumulating plants treated with an excess of aluminium the leaves soon turn yellow, and this is characteristic of dried specimens of *Symplocos*, which have yellowish-green leaves. The aluminium-accumulating plants so far discovered have been mainly tropical, and they are rare in Europe.—[A.H.G.A.]

Ehrenberg, Lars, (1945, *Bot. Not.*, *1945*, 430-437), reports the chromosome numbers of some Scandinavian plants. High chromosome numbers have been found in the genus *Isoetes* and *Lycopodium* as well as tetraploid races of *Scleranthus annuus*. The chromosome structure in *Hottonia* and *Pulmonaria* is discussed. A few chromosome numbers differ from those previously published (e.g. *Carices*, *Scirpus sylvaticus* and *Calla palustris*).—[A.E.W.]

Erdtman, G., 1947, Suggestions for the Classification of Fossil and Recent Pollen Grains and Spores, *Svensk Bot. Tidskr.*, *41*, 104-114. The author defines the terms which he recommends for use in the description of pollen grains.—[A.H.G.A.]

Mitchell, G. F., 1948, Late-Glacial Deposits in Berwickshire, *New Phyt.*, *47*, 262-264. Whitrig Bog shows marl resting on red clay, in the upper layers of the latter leaves of *Salix herbacea* and *S. reticulata* were common. Pollen grains were sparse, but showed a higher proportion of arboreal pollen in the marls. *Pinus* and *Artemisia* were more common in the clay, *Empetrum* in the marls. The clay and lower marl are considered to be late-glacial, and the upper marl post-glacial.—[A.H.G.A.]

OBITUARIES

Compiled by J. E. Lousley.

Edmund Browne Bishop (1884-1947) was born on 23rd September 1884 in the village of Bradpole, Dorset. He was of good yeoman stock and markedly celtic both in features and temperament, a fact of which he was always proud as well as of being a West Country man.

Owing to the early death of his father, his mother was left to support three children on very insufficient means.

The two sons, of whom Edmund was the elder, were destined for the Civil Service, and the family came to London for this purpose when both were very young men. This period of his life was always spoken of as one of considerable struggle.

The younger brother died early, but Edmund rose to a responsible position in the Service, and some fifty years ago went to live at Guildford. He remained in this district at various addresses in Guildford and Godalming for the rest of his life, being joined later by his sister, Mrs C. L. Wilde, who died in August 1941.

Both brother and sister were well known figures in the district, Mrs Wilde serving for some time on the Local District Council. Both shared the love of natural history and both were connected with various natural history clubs in the district.

Edmund was a prominent figure in the London Natural History Society, of which he was President from 1921 to the end of 1924. It was at about this time that he retired from the Civil Service.

His principal hobbies were Archaeology and Botany and in his later years most of his time was given to the latter. He was for many years a member of this society, of the National Trust, in which he took a great interest, of the Commons and Footpaths Preservation Society and of the Society for the Preservation of Ancient Buildings. In 1923 he was co-opted to the Executive Committee of the West Surrey Society and appointed Honorary Warden of the Hydon Ball sub-committee, a work in which he also took a great interest.

It is for his work on the genus *Rosa* that he will be best remembered; both he and Mrs Wilde had a most thorough knowledge of the genus, and their joint work on the Roses of Bedfordshire appeared in *B.E.C. 1938 Rep.*, 84, (1939).

His rose herbarium, consisting of over 3000 sheets of *Rosae* of the British Isles, he left in his will to me. As I was on the point of leaving the country, I did not feel justified in denying students access to the herbarium, which is enriched with copious notes, and I, therefore, decided to present the herbarium to the British Museum for the use of everyone, and it is now at Cromwell Road.

For a long time he and Colonel Wolley-Dod kept the official Census of the *Rosae* of the British Isles and I now have the book containing all the recognised records.

Like me, there are many botanists who will miss Edmund Bishop's kindly help in determining specimens and the encouragement he always gave. A. E. A. Dunston.

E. B. Bishop's general herbarium has been divided between the British Museum (Natural History) and the London Natural History Society. The latter also received his books and certain manuscripts. A more detailed appreciation of his work appeared in the *London Naturalist* for 1947.

J. E. Lousley.

Harry James Goddard (1864-1947) died at his home in Salisbury on 15th August 1947 at the age of 83. The son of James Pond Goddard, a farmer of Huntingford, near Gillingham, Dorset, he was a very kind, loveable character, keenly interested in country matters and proud of the Dorset flavour in his speech.

In 1916 he became Staff Botanist at Dunn's Farm Seeds, Ltd., Salisbury, where his advice was much sought by local farmers. He was regarded as an authority on clovers and the agricultural values of grasses. His life's work was gathered together in "Grasses of Great Britain," a large bound volume containing specimens of more than 200 grasses which he completed in 1936 and presented to his firm.

Mr Goddard contributed to the second edition of Mansel-Pleydell's *Flora of Dorset* (1895) and to the *B.E.C. Reports*. He was a member of the Society from 1911, and a note in *B.E.C. 1918 Report*, 418, (1919), records that he had rescued John Ralfs' herbarium from being used to wrap up groceries. A considerable part of this collection he gave to me. Other notices will be found in *Salisbury & Winchester Journal*, issue of 22nd August 1947, and *The Times* for 15th September 1947.

B. Welch.

Mr C. E. Hubbard sends the following additional note:—"From boyhood days he was keenly interested in the wild flowers of Wessex, and gradually acquired an extensive knowledge of the Hampshire, Wiltshire, and Dorset floras, which was not only utilised by his firm, but also by numerous correspondents in search of material and information. He contributed many specimens from these counties, especially grasses, to the Kew herbarium, and also a portion of John Ralfs' herbarium which he had rescued from destruction. After compiling his first (folio) volume of British grasses, he prepared a second, nearly as complete as the first, which was bound and presented to the Salisbury, South Wilts and Blackmore Museum. A copy of the printed index, with references, etc., to the above work is at Kew. Specimens collected by Mr Goddard were selected by Philipson as the type of *Agrostis stolonifera* L. var. *stolonifera* ecas *calcicola* Philipson (1937, *Journ. Linn. Soc., Bot., 51*, 98).

J. W. Long (1864-1948). Mr J. W. Long of Hillside, St John's Road, Newport, Isle of Wight, passed away suddenly in July 1948, after a slight operation.

He was a Founder Member of the Isle of Wight Natural History Society, in which he took a keen interest. He was a constant contributor of records to the Exchange Club.

Mr Long retired from the Civil Service in 1926. This enabled him to devote himself to his hobby of plant-collecting. His chief interest centred in the alien flora of Britain and the banks of the Medina at Newport provided a favourable habitat for collection and observation, as refuse from the docks was regularly dumped there.

His car enabled him to extend his plant-hunting to other localities, both on the Island and the Mainland. He was an enthusiastic and keen-sighted collector and took endless trouble to verify his identifications. His herbarium has been presented to the Natural History Museum, South Kensington, by Mrs Long.

Being of a very retiring disposition, he took little part in discussions at the I.W. Natural History Society meetings, but many a collector will remember with gratitude his unfailing help and kindness.

Hilda Drabble.

The Rev. Thomas Stephenson, B.A., D.D. (1855-1948). The death of the Rev. Dr T. Stephenson at the ripe age of ninety-two years marks the loss of one of those stalwarts among Wesleyan ministers who distinguished themselves not only in their vocation, but also in the ranks of critical field botanists.

Few who were privileged to know him in his later years would realise that this man of fine presence and high character was a nonagenarian. The circuit system of his ministry involved periodical change of residence and environment. In his case it seems to have provided opportunities for extending his knowledge of British botany in the field.

He was born at Brackley in Northamptonshire but changed his residence frequently in his early years. Before entering the ministry he was a schoolmaster at Wycliffe College (Stonehaven), Trowbridge, and York. After this he was trained at Richmond College, Surrey, and was ordained in 1895. He also acted as Assistant Tutor at the College in Latin, Greek, and Hebrew, to his advantage in the description of species. While he was a botanist of wide interests, including mosses and hepatics, fungi, fresh-water algae and lichens as well as flowering plants within his scope, his leading contribution to published botanical records lay in his study of the British orchids. As volumes of the *Journal of Botany*, and the *B.E.C. Reports* bear witness, he took great interest in the critical examination of two groups of these, the *Dactylorchis* group of the genus *Orchis*, and the genus *Epipactis*. He published a series of over twenty papers over the years 1918-1942, most of

them appearing in the *Journal of Botany*, which contributed materially to the knowledge of the groups concerned.

The revision which was involved resulted in the recognition of three new British species, *Orchis purpurella* T. & T. A. Stephenson, *Epipactis vectensis* (T. & T. A. Stephenson) Brooke & Rose and *Epipactis dunensis* (T. & T. A. Stephenson) Godfery.

His study was not confined to the British Isles. In connection with his studies of the geographical distribution of the Dactylorchids he went to France, Spain and Algeria with the assistance of grants from the Royal Society.

In his later years, when resident at Torquay he took an active part on the Editorial Committee of the Botanical Section of the Devonshire Association in the preparation of the first volume of *Flora of Devon* (1939) and subsequently collected data for Devon Mosses in collaboration with the late G. T. Fraser for the proposed second volume of that work. He was elected an Honorary Member of the Devonshire Association in 1943.

Mention must also be made of the valuable work he did for the Botanical Section of the Torquay Natural History Society which he joined in 1934, contributing papers on British Orchids to its *Transactions*, joining the regular botanical excursions in the Torquay District in season, and helping in the collection, determination and display of local plants for the botany table in the Museum. He left Torquay in 1941 to reside with his son at Aberystwyth, giving to the Torquay Natural History Society his collection of orchids and foreign plants (770 sheets). Returning to Torquay in 1944, he succeeded Mr E. Milton as chairman of the Botanical Section of the Society, contributing in that capacity papers on " Some rare and interesting orchids " and " Some biological problems."

At the age of 90 he took an active part in a botanical excursion to Bradley Woods, arranged by the Botanical Section of the Devonshire Association, climbed the wooded limestone outcrop, read a summary of a botanical paper by H. W. Pugsley at the request of the author, and demonstrated specimens of flowering plants and fungi he had gathered at Torquay.

His final efforts included a note contributed to *The Naturalist* (April-June 1946) describing a hybrid between *Senecio squalidus* and *S. vulgaris* var. *erectus*, with drawings by his daughter, Miss Mary Stephenson, who was a lecturer on biology at the University College of the South-West, Exeter, before her marriage. He proposed the name × *Senecio nitidus* Stephenson for this. Failing eyesight and diminishing strength led to his moving to Hindhead, Surrey, where he died on April 15, 1948.

I am grateful to his son, Professor T. A. Stephenson of Aberystwyth, with whom he collaborated in much of his research work on Marsh Orchids, for assistance in preparing this appreciation.

F. A. Brokenshire.

LIST OF BOTANICAL PAPERS PUBLISHED BY DR T. STEPHENSON.

(Based on a list supplied by his son.)

1918 : A New form of Helleborine viridiflora, *J. Bot.*, **56**, 1-4.
1920 : A New Marsh Orchis, *J. Bot.*, **58**, 164-170.
1920 : The Genus Epipactis in Britain. *J. Bot.*, **58**, 209-213.
1920 : The British Marsh Orchids in Relation to Mendelian Principles, *J. Bot.*, **58**, 243-7.
1920 : The British Palmate Orchids, *J. Bot.*, **58**, 257-62.
1921 : Orchis latifolia in Britain, *J. Bot.*, **59**, 1-7.
1921 : Epipactis latifolia in Britain, *J. Bot.*, **59**, 33-39.
1921 : The Forms of Orchis maculata, *J. Bot.*, **59**, 121-8.
1921 : Epipactis viridiflora, *J. Bot.*, **59**, 205.
1921 : Orchis praetermissa and O. purpurella (in Holland), *J. Bot.*, **59**, 234.
1922 : Hybrids of Orchis purpurella, *J. Bot.*, **60**, 33-35.
1923 : Orchis praetermissa Druce, *J. Bot.*, **61**, 65-68.
1923 : The British Forms of Orchis incarnata, *J. Bot.*, **61**, 273-78.
1924 : The British Dactylorchids (in collaboration with Col. M. J. Godfery), *J. Bot.*, **62**, 175-8.
1925 : Some French Marsh Orchids, *J. Bot.*, **63**, 93-7.
1927 : The Flora of Asturias, *J. Bot.*, **65**, 70-74.
1928 : Dactylorchids in France and Great Britain, *Bull. Soc. Bot. de France*, **75**, 481-95 (reviewed in *J. Bot.*, **67**, 79-81, by E. G. Baker).
1928 : Southern Marsh Orchids, *J. Bot.*, **65**, 97-102.
1928 : Orchid Hunting in France; *B.E.C. 1927 Rep.*, 493-498.
1928 : Preservation of Herbarium Specimens, *J. Bot.*, **66**, 123.
1928 : Epipactis dunensis. *J. Bot.*, **66**, 273-4.
1930 : The British Palmate Orchids, *J. Bot.*, **68**, 151.
1930 : Sur quelques plantes nouvelles ou peu connues de l'Algérie orientale (in collaboration with Prof. R. Maire), *Bull Soc. d'Hist. Nat. de l'Afrique du Nord*, **21**, 48-50.
1930 : Notes on Orchis purpurella, *B.E.C. 1929 Rep.*, 203-4.
1931 : Dactylorchids of North Africa. *J. Bot.*, **69**, 145-150; and 177-180.
1931 : The Flora of Algeria, *J. Bot.*, **69**, 305-9.
1934-5 : What is Orchis latifolia ?, *Trans. Proc. Torquay Nat. Hist. Soc.*, **7**, 27-32.
1937 : Two Varieties of Orchis purpurella, *B.E.C. 1936 Rep.*, 355-7.
1937-8 : Spotted Orchids, *Trans. Proc. Torquay Nat. Hist. Soc.*, **7**, 259-62.
1938 : Epipactis rubiginosa, *J. Bot.*, **76**, 56.
1939 : *Flora of Devon, Phanerogams, Vascular Cryptogams, Charophyta*; (Dr Stephenson acted as Assistant Editor for this volume, and was responsible for the sections on Orchids, *Euphrasia*, etc.).
1942 : A New Hybrid Dactylorchis, *J. Bot.*, **80**, 104.
1942 : Dactylorchids in Cardiganshire, *J. Bot.*, **80**, 77.
1946 : A New Senecio Hybrid (S. squalidus × S. vulgaris var. radiatus), *The Naturalist* (1946), 137-8.
1946 : Linaria purpurea (L.) Mill. var. rosea var. nov., *The Naturalist* (1946), 138.

REVIEWS

A Prodromus of the British Hieracia. H. W. Pugsley. Pp. 357 with 16 plates from drawings by the author, and 1 figure in the text. London: issued as Vol. 54 of the *Journal of the Linnean Society of London*, and sold at the Society's rooms and by Longmans, Green & Co., Ltd., 1948: £3.

Hieracium is generally regarded as the most difficult of all the larger critical groups of British phanerogams. The genus exhibits a range of variation which almost defies classification by ordinary taxonomic methods, and previous attempts to revise our Hawkweeds have been patently inadequate even by the standard of the times at which they appeared. More satisfactory work has been done by French, German, Swiss and Scandinavian botanists but efforts to relate British material to continental names have not been successful. Such results were inevitable while European workers had only a slight acquaintance with the *Hieracia* of the British Isles and our own botanists had little experience abroad. The *Prodromus* not only exhibits a much higher scientific standard than its predecessors but it also represents the fruits of long experience in the field both in these islands and on the Continent.

The complexities of the task awaiting a monographer of *Hieracium* can only be adequately appreciated by those who have tried to name their own material. In Britain the group includes few well-marked species which are at all widely distributed—such as *H. umbellatum*, *H. prenanthoides*, and *H. Pilosella*. In addition, there are some local plants, such as *H. cambricum*, with sufficiently clear-cut characters for easy recognition. Some of these, like Pugsley's new *H. deganwyense*, are apparently restricted to a few individuals on a single rock-face. But the great majority of our Hawkweeds differ from their allies only in characters which are hard to appreciate and still harder to define.

These differences are in part due to environment. A single colony of a common and plastic species such as *H. Lachenalii* growing partly in shade and partly in the open, partly in deep rich soil and partly on dry shallow soil (such as Pugsley named for me from Grin Low, Buxton), will show such a range of variation that it is difficult to believe that they all belong to the same taxonomic unit. In addition, parthenogenetic reproduction is widespread in *Eu-Hieracium*. Besides sexual species there are triploid, tetraploid and pentaploid apomicts known in Scandinavia and it is almost certain that they occur here. On account of apomixis small variations are reproduced from seed and it is to this that the multiplicity of very local variants is attributable. Almost every cliff where Hawkweeds abound provides its own selection. Where they are sufficiently well marked they receive special names; when the

differences are less easily defined they are merged by taxonomists with variants from elsewhere. Hence the group, as Pugsley remarks, consists of " a multitude of named forms with which no other genus of flowering plants can be compared." To typify these names is a difficult enough task. To arrange them in a logical account capable of practical application requires judgment and shrewd observation in addition to painstaking research of a kind which few men are fitted to undertake.

Even with these attributes there is room for doubt whether ordinary taxonomic methods as employed by Pugsley can ever produce a completely satisfactory account of the group. The best that can be hoped for by a monographer is that he will be able to carve out of the great mass of variable material sufficient definable units to enable future workers to name most of their material. In this Pugsley has been remarkably successful. A rough estimate may be hazarded that he has accounted for 75 to 80% of the plants gathered by an average worker. The balance will include definable but undescribed units (of which a number were known to Pugsley but not included in his account—cf. p. 20) and also variants which can perhaps never be satisfactorily incorporated in any descriptive work. Appreciation of this is necessary both for an understanding of the magnitude of the task the writer undertook and for intelligent use of the *Prodromus* as a work of reference.

The first 25 pages of the book are of an introductory nature. The history of the study of *Hieracia* in Britain is succinctly stated with reference to such foreign work as is appropriate. An excellent section on morphology includes definitions of some of the special terms used later in the work and much original observation. Special attention is drawn to the value of the characters provided by the receptacular alveoles which have been neglected by some earlier workers. Then follow three pages on classification, a useful account of experiences with Hawkweeds in cultivation, and a statement of the material mainly consulted and the author's standards for nomenclature.

The main part of the book commences with a 10-page Conspectus of sub-genera, sections, series, and species. In this the author's knowledge and experience are displayed to full advantage. The arrangement adopted is based on that of Zahn's monograph in *Pflanzenreich*, **IV. 280**, 1921-3, but it differs fundamentally in the distribution of Zahn's " intermediate species " and " hybrids " between the generic subdivisions, and in the non-adoption of the grade of sub-species. In addition, new groups have been created where required. The result is an arrangement which is probably as near to perfection for naming British Hawkweeds as can be devised. The mastery of the characters of so many described units and their arrangement in a workable scheme is one of the outstanding features of the *Prodromus*. If this Conspectus could be reprinted and issued separately it would be a great convenience even for those who possess the whole work.

The descriptive part of the book occupies 294 pages and includes 260 species. It is interesting to compare this figure with the number of species accepted for Britain by other writers:—

Backhouse (1856)—33 species.
Hanbury & Thompson (1904)—97.
Linton (1905)—124.
Roffey in *London Catalogue* (1925)—248.

The increase in Pugsley's work is very much greater than these statistics would suggest. A number of species accepted by earlier writers are reduced to varietal rank or shown to have been included in British works through false identifications with foreign plants. This applies particularly to names taken up by Linton and Roffey. In some instances (e.g. *H. exotericum*) Pugsley's species include several plants which were formerly treated separately. The net gain in additions to the British list is so much the greater. No fewer than 71 new specific names on Pugsley's authority (including those published briefly in 1941, *Journ. Bot.*, **79**, 177-183 and 193-197), appear in the *Prodromus*, and a considerable number of those already described on the Continent are added to our flora for the first time. He has cut away much of the dead wood which littered the ground before planting new trees.

The species are all treated on a uniform plan. Each section is preceded by a conspectus. For each species he gives synonymy, icones, exsiccatae, distribution in Britain (by vice-counties) and abroad. The descriptions are very full and drawn up in the sequence of habit, stem, foliage, inflorescence and fruit so that comparison is facilitated. A diagnosis in Latin is included in the case of novelties. In addition, the outstanding characters are summarised in a paragraph (or more) which usually also sets out the botanical history of the plant in Britain and its relationship to allied British and foreign forms.

Very great skill is shown in these observations, which bring out the really important characters in a way which has never been done for British *Hieracia* before. With a herbarium sheet beside you it is often possible to obtain a clearer idea of the salient characters of a species from Pugsley's remarks (so often prefaced by " is readily known " or " is remarkable for . . . ") than from the whole paragraph of description. Once the features of the species are grasped the varieties and forms usually fall into line without difficulty.

It is apparent throughout the work that Pugsley has examined Hawkweeds in far greater detail than any previous British workers. In fact, some of the latter must have relied almost entirely on macroscopic characters using the lens to very poor advantage. *H. cillense* is a particularly good example of this. The material on which it is based was collected by Augustin Ley and described as *H. hypochaeroides* in W. R. Linton's *British Hieracia*. It was said to be characterised by dull grey-green foliage but the fact that the colour of the leaves is due to abundant stellate hairs on both surfaces was entirely overlooked. This character is to be found in only one other Hawkweed of the Sec-

tion *Vulgata* and on it Pugsley founds his new Subsection *Stellatifolia*. Similar attention to details of the hairs and glands on all parts of the plants is recorded in all the descriptions.

By way of testing the adequacy of the accounts given in the *Prodromus* I have used it to rearrange my own collection of some 500 gatherings. With one or two exceptions (e.g. *H. lepistoides* K. Johansson) all the names which had been used on the labels were precisely accounted for in the synonymy. Only a few instances were found of new county records and these were mostly plants which Pugsley had determined himself some years ago. Almost all the gatherings from well-known collectors were cited. From this it would appear that his work in collating names employed by earlier authorities has been thorough and the distribution in Britain is shown as adequately as can be expected.

While subjecting the *Prodromus* to this test I encountered several difficulties. The most serious of these arose from the inadequacy of the citations of material—and especially of those of the distribution records. To base a vice-county record on a plant of which the only details given are " Dorking (Lousley) " is not sufficient. I have collected at least a dozen Hawkweeds (three of them on one day) which have been labelled with detailed localities including the name of this Surrey town. It is only by the determinations written by Pugsley on the sheets in my herbarium that it is possible to match up the record with the material on which it is based. Moreover, the reader is left guessing about the whereabouts of the specimens and the only clue given in the *Prodromus* is " The specimens cited as exsiccatae and those shown in the distribution lists under each species . . . are mostly to be found in the Natural History Museum." Difficulties and ambiguities are certain to arise over many of the specimens intended to support the records since *Hieracium* species so often grow in company. In spite of this Pugsley's distribution lists must be accepted as the basis of further recording of vice-comital distribution. If he had given full details of each record the book might have been too long to be printed.

An almost equally serious difficulty arose from the author's failure to use dated determinavit slips when examining herbarium material. His knowledge of Hawkweeds grew very rapidly. His concepts of the limits of species and the names to be used were (as might be expected) subject to continual change and this went on right up to the time of his death. As late as October 1947 he handed me a note correcting an earlier naming about which he had altered his opinion. In these circumstances the value of an undated determination is limited and it should be used with caution. Fortunately I was in the habit of dating his notes when the plants were returned to me but in cases where this was not done it is impossible to say whether they reflect his later views or not.

A criticism of the accounts of the species arises from the rather surprising omission of flowering dates. Pugsley was very well aware of

the useful additional character this provides in the case of the Hawkweeds he studied so carefully near Tunbridge Wells. Here, for example, he drew my attention to *H. trichocaulon* flowering about a month earlier than *H. tridentatum* with which it can be confused. He formed the opinion that most (but not all) of the species in that district had sharply defined times of flowering which could be useful in helping to distinguish them from their allies. If this is the case with lowland *Hieracia* it may well also apply to the mountain plants. Both in Wales and Scotland rock-faces certainly produce a different selection on early summer visits from those to be found later on. It is unfortunate that the information available on herbarium labels has not been collated.

The nomenclature used in the book will need very careful re-examination. Owing to the multiplicity of names and the highly critical nature of the group it seems inevitable that errors will be found. These were no doubt increased by the extreme difficulty of the later years of the author's life and the impossibility of consulting many rare books under conditions of war-time dispersal. In addition, Pugsley had a certain obstinacy of character which prevented him from tidying up his nomenclature. He regarded " *comb. nov.*" and " *nom. nov.*" with suspicion because the terms are not embodied in the International Rules. Insufficient care was taken over typification. Readers should refer to Wilmott's notes (1944, *B.E.C. 1941-2 Rep.*, 518-522) on the names published in 1941. It will be found that the prototypes cited there for *H. carneddorum* and *H. chloranthum* differ from those given in the *Prodromus*.

On nomenclature Pugsley took an essentially practical view. He regarded it very properly as the handmaiden and not the mistress of taxonomy, and it was this attitude which laid him open to criticism. It is far better to continue to use his names until such time as someone else has acquired a comparable knowledge and experience of the taxonomy of the group rather than to attempt to alter them piecemeal for purely nomenclatural reasons. The *Prodromus* will give a tremendous stimulus to the study of Hawkweeds in this country. It is hoped that great caution will be exercised in publishing changes until its contents have been assimilated and understood.

The main body of the work is followed by an account of " The distribution of Hieracia in Britain and their origin." For the first time the geographical relationship of our species is analysed and related to the Continent. The conclusions support the taxonomic work earlier in the volume and are an important addition to our knowledge of plant geography.

The general impression left after examining the *Prodromus* could hardly be better expressed than by a paraphrase of its author's own words (p. 7) with reference to Zahn:—" It is impossible not to admire this work of Pugsley's, which is a monument of critical research, patient investigation and infinite labour; and when, in classifying the British forms . . . one is unable sometimes to agree with his conclusions, it

may well be wondered that such differences of opinion are not more frequent, when the complexity of the genus is remembered, and the difficulty or impossibility of a monographer obtaining adequate material for examination of the almost innumerable forms involved." Pugsley has done for British *Hieracia* what he did for *Euphrasia* and in reducing chaos to order he has produced the most important addition to the literature of British taxonomic botany which has appeared for several decades. When he died in November 1947 the last batch of galley-proofs had still to be corrected. We are greatly indebted to Mr N. Y. Sandwith for the skilful way in which he carried out the difficult task of seeing the work through the press.

J. E. Lousley.

The Genus Crepis. Ernest Brown Babcock. Pp. 1030 + 22 with 305 figures [diagrams, maps and line drawings], 36 plates (1 coloured) and 19 tables. Part One, the Taxonomy, Phylogeny, Distribution and Evolution of *Crepis*: Part Two, Systematic Treatment. Issued as Volumes *21* and *22* of *University of California Publications in Botany.* Berkeley and Los Angeles, California: University of California Press (London: Cambridge University Press), 1947; Part One, $4.00 cloth, $3.50 paper; Part Two, $12.00 cloth, $10.00 paper [10¼″ × 6¾″].

This book is probably the first example of a complete monograph of a large genus of plants in which modern taxonomic methods are used to supplement classical ones. The interest of the book, therefore, extends, for British botanists, far beyond the few British species of the genus.

Part One (196 pp.) contains the general matter, as explained in its title. It starts with an account of the author's researches, which are divided into three main groups: (1) taxonomic, (2) research on the chromosomes [i.e. chromosome numbers and morphology] and (3) genetic and cytogenetic research. The author rightly emphasises that the basis of his treatment rests [as a monographic treatment always must] on the basis of comparative morphology and that cytogenetic research and geographical distribution are used in conjunction with it and not as the primary basis of classification. The value of cytogenetics, however, becomes apparent when it is seen that the author was enabled by its use to reduce to *Crepis* several genera recognised on the basis of morphological characters (e.g. scales on the receptacle) which proved not to be of fundamental importance in this group.

The majority of *Crepis* species are diploid. Apart from one American section (*Psilochaenia*) of secondary polyploids with x (basic number) = 11, polyploidy was found in only 6 species out of 103 examined. Of the 97 diploid species, 3 have n = 3, 58 n = 4, 19 n = 5, 14 n = 6 and 3 have n = 7. In spite of the prevalence of n = 4, the more primitive species have n = 5 or 6, and Professor Babcock concludes from this and

other evidence that 6 was the original haploid number in the genus. There are three general trends in karyotype evolution: (1) decrease in chromosome number; (2) increase in asymmetry of the chromosomes and (3) decrease in chromosome size, each occurring along a number of lines. Except for x = 7 and 11, the various numbers occur in a number of different sections.

Comparatively few characters have been investigated genetically, but the scales on the receptacle mentioned above are shown to have a simple genetic basis in two instances. [It would be interesting to find out if receptacle scales have the importance usually attributed to them elsewhere in the Compositae.] Much of the genetical work consisted in hybridising different species (about 200 interspecific crosses were made) with a view to determining their relationships by observations on the sterility and chromosome behaviour of the hybrids obtained.

The author concludes that in *Crepis* gene mutation and structural changes in the chromosomes have been the important factors in evolution, that polyploidy is of slight importance and that apomixis only occurs in Sect. *Psilochaenia*.

In Chapter 2, on Taxonomic Concepts, the kinds of species found in *Crepis* are analysed and set out in a table on the basis of polymorphic as against monomorphic; diploid as against polyploid; and apomictic as against sexual. The author recognises and names subspecies, but rejects Latin names for ranks below this, calling them " minor variants " and giving them only numbers. The reasons for this latter course are not clear. Bentham and Hooker's subgenera are rejected and the genus is divided into 27 sections which " can be grouped roughly into three divisions, namely primitive, intermediate and advanced." These three divisions, however, in no way correspond with Bentham and Hooker's subgenera.

Chapters 3 and 4 deal with the criteria used in classification and phylogeny and the results obtained from their use. The habit of the plant is of great importance, the rhizomatous species being primitive and the tap-rooted species derived from them. Other phylogenetically significant characters are obtained from the involucre which shows, in general, a trend involving reduction in size, in number of bracts and in the relative size of the outer bracts. In four species the involucral bracts become much thickened and indurate, enclosing the achenes in fruit. This is shown most markedly in *C. Zacintha* which has usually been put in a distinct genus (*Zacintha*). It is, however, clearly related to the other three and the generic distinction cannot be maintained. Other criteria used are the trends in karyotype evolution, already discussed, and the results of the inter-specific hybridisations. The suggestions are made that the genus arose from *Dubyaea*, that the tap-rooted habit arose from the rhizomatous one several times, and that—with the possible exception of three sections—the genus is monophyletic.

The remainder of Part One deals with the geographical distribution of *Crepis* and with the author's theories on the origin and migrations

of the group. While these chapters contain much information, often in concise tabular form, they are, on the whole, the least convincing part of the work. The author invokes continental outlines since the tertiary period, the mountain ranges of Asia, the migration of other plants as shown by fossils, the ecological relations of *Crepis* and even the Artiodactyl ungulates (suborder Pecora, including deer, oxen, giraffes, etc). One is, however, left with the impression that he attempts too much and that he has not made out his case—that he talks of mere speculations as probabilities. Too much weight appears to be given to migration and too little to subsequent evolution. Six allied African species, for example, each now confined to a single (different) mountain or mountain range, are considered to have migrated there from Central Asia. The now exclusively American section *Psilochaenia* (distinguished from all other sections by having x = 11) is considered to have had a polyphyletic origin by hybridisation between species of various sections in Central Asia, to have subsequently migrated to North America, and to have become extinct in its original home. [The taxonomic treatment of this section in Part Two is also open to criticism on general grounds. As, however, the section has been treated in more detail in an earlier work by Babcock and Stebbins, it would be out of place to discuss it further here.] Such phrases as " because they failed for some reason to get through the Iran-Asia Minor region, remain as relics in that general region " would be more in place in a discussion on human migration than in one of that of plants. There also seems to be an underlying assumption that because a species has many primitive characters, it is necessarily old *as a species*. To sum up the section, one may say that there is too much detail given when so much is left unexplained.

Part One ends with four appendices, of which that on " Some *Crepis* Problems calling for Further Research " is the most interesting, a list of references and a good index.

Part Two contains the Systematic Treatment of the genus and deals, in all, with 196 species. Each species is fully described and illustrated by a line drawing, the illustrations including dissections and, wherever possible, the somatic chromosomes. After the description follow synonymy, distribution (in general terms) and habitat, and a discussion on variation within the species. Next comes a list of specimens seen, with the herbarium in which they occur, including, in most cases, the type. Dates of collection are only given when there is no collector's number; it would have been an advantage had they been given in all cases. A list of " minor variants " follows; these are given numbers but not named, though, if they have previously been named, the names are cited. The account of each species concludes with a discussion of the relationships of the species. Under the sections, besides a description, there is a discussion of relationships, a map (or maps) showing the distribution of the species and a key to the species. At the beginning of the part are both diagnoses of the sections and an artificial key to

them (an example which might be more often followed in monographs). The plates are photographs of types or other interesting specimens. The whole appears to be admirably done and there should be no difficulty in identifying any member of the genus by its use.

It may be of interest to set out Professor Babcock's treatment of the species given in the *British Plant List* (including those added in *B.E.C. Reports* since its publication), with their chromosome numbers. The names under which they figure in the *B.P.L.* are given in brackets, where different. († = introduced species.)

Sect. 1 *Desyphylion*
4 *C. paludosa* (L.) Moench. 2n=12.

Sect. 5 *Mesomeris*
19 *C. mollis* (Jacq.) Ascherson 2n=12 (*C. mollis* Asch.).

Sect. 10 *Berinia*
64 *C. biennis* L. 2n=40±.

Sect. 14 *Mesophylion*
114 *C. tectorum* L. 2n=8.

Sect. 19 *Phaecasium*
†138 *C. pulchra* L. 2n=8.
a. subsp *typica* Babc.

Sect. 20 *Hostia*
†142 *C. alpina* L. 2n=10.
†144 *C. rubra* L. 2n=10.
145 *C. foetida* L. 2n=10.
a. subsp. *vulgaris* (Bisch.) Babc.
†b. subsp. *rhoeadifolia* (Bieb.) Schinz & Keller. (*C. foetida* var. *hispida* Bisch.).
†c. subsp. *commutata* (Spr.) Babc. (*Rodigia commutata* Spreng.).

Sect. 22 *Pterotheca*
†155 *C. sancta* (L.) Babc. (*Lagoseris neumausensis* [*sic*] (Gouan) Koch).
a. subsp. *nemausensis* (Gouan) Thell. 2n=10.

Sect. 23 *Zacintha*
†159 *C. Zacintha* (L.) Babc. 2n=6. (*Zacintha verrucosa* Gaertn.).

Sect. 24 *Phytodesia*
†160 *C. nicaeensis* Balb. 2n=8.
161 *C. capillaris* (L.) Wallr. 2n=6.

Sect. 25 *Lepidoseris*
181 *C. vesicaria* L.
a. subsp. *taraxacifolia* (Thuill.) Thell. ex Schinz & Keller. 2n=8, 16. (*C. taraxacifolia* Thuill.).

Sect. 26 *Nemauchenes*
†188 *C. setosa* Hall. f.
a. subsp. *typica* Babc. 2n=8.

A few comments on the list may be made. *C. foetida* occurs as three subspecies with different, though overlapping, areas of distribution; subsp. *commutata* is the most eastern and has been regarded as belonging to a distinct genus owing to the scales on the receptacle; subsp. *vulgaris* is the most western and the only one that could be native to Britain; subsp. *rhoeadifolia* may have arisen as a hybrid between the other two. *C. foetida* var. *hispida* Bisch. is cited as a synonym of subsp. *rhoeadifolia*, but Drabble (1933, *J. Bot.*, **71**, 63), who first recorded it as British, gives only the difference of the type of hairs on the involucre; further investigation is needed to see if the subspecies really occurs in Britain, since Babcock gives it additional characters. It is not clear why Babcock uses the name subsp. *vulgaris* (1938) rather than subsp. *eufoetida* Beger ex Domin (1935) which he cites as a synonym.

It would appear that the combination *C. sancta* subsp. *nemausensis*, which is attributed to Thellung, should have been cited as " Babc. comb. nov." since Thellung is stated to have kept the species under *Lagoseris*.

Some of the varieties of *C. capillaris* given in *B.P.L.* are given under " minor variants," but others are not mentioned. It is suggested that var. *anglica*, and also " *C. Druceana*," which is considered to be a different form, may be polyploid, although such are not definitely known in this species.

C. taraxacifolia is regarded as the most widespread of eight subspecies of *C. vesicaria*, some of the others being narrow endemics, though subsp. *typica* is widespread in the Mediterranean Region. Subsp. *taraxacifolia* is usually diploid though tetraploid forms occur in Spain. It seems that they are morphologically distinguishable and they should surely be recognised taxonomically and given a higher status than " minor variants ". It is suggested that a giant form (identified with var. *gigantea* (Rouy) Thell.) which is cited from England, may also be tetraploid, though there is no direct evidence of this.

Crepis bulbosa is excluded from the genus and listed as *Aetheorrhiza bulbosa* (L.) Cass.

This monograph is likely to remain the standard work on the genus for a long time. It should serve as an example for future monographers in showing how cyto-genetics and experimental methods can be used in conjunction with morphology to elucidate even a large group. Professor Babcock is to be congratulated on a fine work.

E. F. Warburg.

Welsh Ferns. H. A. Hyde and A. E. Wade. 2nd edition. Pp. 131 + 10, 67 figures and 10 + 1 plates. Cardiff: National Museum of Wales and Press Board of the University of Wales, 1948; 5/-. [8½ × 5½; thick cardboard.]

At first sight this bears an extremely close resemblance to the first edition (1940), including the all important matter of price, which is still extremely good value at five shillings. A closer inspection shows that a large number of new county and other records have been added. In

addition, the dates when the species were " first recorded " has in many instances been put back to 1606-8, owing to the discovery of some MS. records by Sir John Salusbury in his copy of Gerard's Herbal, now in the Library at Christ Church, Oxford. The nomenclature and the discussion of the classification of ferns does not seem to have been revised and it is surprising that, while Bower's views are set out in some detail, the more recent classifications of Christensen, Holttum, Ching, and Copeland are not mentioned. Nor is there any mention of the nomenclature of Clapham's Check-List (1946). Though intended primarily for Wales, the book includes descriptions of such species as *Ophioglossum lusitanicum* and *Anogramma leptophylla* which are, in Britain, confined to the Channel Islands, and as it is the only modern systematic handbook to the British ferns, should be most useful to many outside the Principality.

The varieties included are of somewhat unequal value and require further study. Apparent new transfers of varietal names are made without quoting the name-bringing synonym. Some of the extra-British distributions would not bear very close inspection: for example, *Asplenium Trichomanes* does not occur in Peru, nor *Hymenophyllum tunbridgense* in Venezuela. The adoption of the name *Hymenophyllum peltatum* seems doubtfully correct, as to do so assumes that the British plant is conspecific with an imperfectly known plant from the island of Réunion.

The hints to collectors (on p. 32) are a useful innovation, but something might have been said about labelling specimens.

The large number of localities given for *Polypodium vulgare* var. *serratum* is surprising, as this seems to be a limestone plant in most places. It is probable that the Welsh localities require revision.

A. H. G. Alston.

The Geography of the Flowering Plants. Ronald Good, M.A. (Cantab.). Pp. 403 with 71 line drawings, 9 maps in colour and 16 photogravure plates. London, New York and Toronto: Longmans Green & Co., 1947; 30/- net [10″ × 6″; cloth].

A comprehensive book on plant distribution has been a *desideratum* for some time and this book goes a long way to fulfil the need. The subject is one which is difficult to compress into reasonable compass, needing as it does ample illustration by examples and yet comprising principles which need to be made clear. It should, perhaps, be stated at the outset that the book deals with the distribution of species, genera and families and does not set out to give a picture of world vegetation, an aspect of botany to which the name " plant geography " is also often given.

The book begins with a short introduction including sections on the importance of plant geography, the difference between vegetation and flora, classification (3 pages), nomenclature (2 pages), and the history of plant geography. The value of the sections on classification and

nomenclature is very doubtful. The attempt to define such terms as "family," "genus" and "species" on a single page can only mislead. In particular, the suggestion that a genus is a more natural category than a species or family is unfortunate. It is doubtless the fact that it is the most convenient unit for purposes of plant geography that leads to this statement. The definition of species given means little.

The main mass of the book is divided into two parts, the first containing 14 chapters dealing with the facts of distribution, the second of 8 chapters dealing with the factors of distribution and conclusions. Chapter 1 gives a brief introduction to the geography of the world and a short discussion of map projections. Chapter 2, after a brief discussion, sets out the "classification of the world into floristic units" that the author adopts. The world is divided into 5 kingdoms (some divided into sub-kingdoms) and 36 regions, many of which are further divided into provinces. The region is the unit mainly used in the subsequent discussion. A useful map is given showing the limits of the regions. It may be noted that the British Isles belong to the Boreal Kingdom, Euro-Siberian Region and the province of West Europe. It is pointed out that the Euro-Siberian Region is "much more extensive, in longitude at least, than any of the others" and that it is therefore often necessary to treat it as a special case.

Chapter 3 gives a short account of the evolutionary background. This might perhaps have been extended but is useful in showing the author's outlook. He rightly points out (p. 45) that the production of the same form from the same parent stock more than once ("polytopic" and "polychronic" descent), which modern thought considers likely to occur, is to be distinguished from older ideas of "polyphyletic descent." The suggestion made that different environments are likely to *produce* dissimilar mutations is, however, open to criticism; though, as it is likely that different environments will *select* different mutations, the effect may be the same. The remainder of the chapter deals with endemism, discontinuity and with two current theories of plant distribution.

The next eight chapters give details of distribution of families, genera and species considered in turn. In each category cosmopolitan examples are first described, followed by other types of wider distribution, then discontinuous and finally endemic types. In the last category, each region is considered in turn and the other categories are also divided geographically. Numerous maps are given, often accompanied by figures or plates of the plant concerned. These chapters are so packed with valuable information that it seems undesirable to single out anything for special comment. Many examples are given throughout and the reader will find many familiar names, of both native and commonly cultivated plants.

Chapters 12 and 13 will be of special interest to members, as they deal with the British Flora. The first chapter deals with its history and distribution, starting just before the Ice Age. An account is given

of the various views on the effect of the Ice Age and an outline of post-glacial history. An account of H. C. Watson's work follows.

An attempt is then made to estimate the number of species native in Britain. The author reaches the conclusion that the number is about 1250 (excluding microspecies). The chapter concludes with an account of Matthews' work on the geographical elements in the British Flora. Chapter 13 gives some account of the author's own work on the distribution of plants in Dorset. It is of special interest in that it is work along new lines and is of a type that might well be undertaken by any member of the Society. He points out that the distribution of some species appears to be climatically determined and that of other species edaphically. A particularly interesting group (containing *Filipendula hexapetala* and *Verbascum nigrum*) are, in Dorset, confined to the more northerly parts of the Chalk Belt and the author suggests that their distribution must be climatically determined within their edaphic requirements. It would be interesting to extend observations on these species over the whole country.

The concluding chapter of Part I gives an account of past floras and of the effect of the Ice Age. The difficulties inherent in the interpretation of fossil evidence are well brought out.

Chapters 15 to 20 are an account of the various factors controlling plant distribution. They contain little that is new, but give a balanced picture of the whole. The sections on competition, on the naturalisation of plants in New Zealand, and on Wegener's continental drift hypothesis may be mentioned as of particular interest. The chapters are well illustrated by maps showing various aspects of world climate.

Chapter 21 on " The Theory of Tolerance " sets out the author's ideas on the reasons why plants occupy definite areas. He holds that the distribution of a species is mainly determined by its range of tolerance for climate and edaphic conditions, and sets out six principles on which the " theory " is based. It is perhaps doubtful whether the principles stated should be given the title of a " theory " but the chapter contains much good sense and should clear away many misconceptions concerning plant ranges. Perhaps, however, too little weight is given to the existence of barriers to dispersal and of minor changes in conditions.

The last chapter, entitled " Conclusions," is in fact a brief recapitulation of Angiosperm history, the author's main conclusions having been set out in the preceding chapter.

The book concludes with two appendices, bibliography and indexes. The first appendix gives " Statistics of the World's Land Surfaces," arranged in vegetational and latitudinal zones, the effect of altitude also being taken into account. The second appendix is a list of discontinuous genera. There are separate indexes of plant names and of names of persons and places, but no general index.

As is inevitable in a book of this scope, there are a number of errors. Some of them will be, however, rather surprising to anyone with a good acquaintance with the British Flora and should have been avoided. A few examples may be given. The map (p. 202) showing the distribution

of *Pinguicula* in the British Isles shows the doubtful Skye and erroneous Sutherland localities for *P. alpina*, but not the recognised one in E. Ross (though the plant is now extinct there); and the similar map of *Primula* shows *P. elatior* as extending to the East Anglian coast and *P. veris* as absent from Orkney and the Inner Hebrides. The definition of " Denizen " is not Watson's and corresponds closely with Watson's " Alien "; and " Casual " was recognised as a separate category by Watson in his *Compendium* (1868). The application of the term " phenotype " to the number of apparently different *species* is peculiar. *Utricularia* and *Pinguicula* are not (p. 291) restricted to " markedly acid habitats ". *Asparagus* (p. 91) is not confined to " South Africa, Mascarenes to Malaya " and *Ligustrum* (p. 356) should not be given as an example of a genus of " Eastern North America and East Asia with extensions into the tropics of one or both hemispheres." Many other examples might be given.

A criticism of a more general nature is that one is left with a feeling that there is a gap to be bridged between the facts as set out and the conclusions drawn from them. An attempt to interpret some of the distributions given in earlier chapters would have added considerably to the interest of the book.

This gap, and the somewhat prosaic style in which the book is written, make it a book to refer to rather than one to read, but, as such, it may be recommended to all interested in the broader aspects of the British Flora.

E. F. Warburg.

Natural History in the Highlands and Islands. F. Fraser Darling. Pp. xvi, 303, 32 col. pl., 32 black and white pl., 9 maps and diagrams, and 15 distribution maps. London: Collins (The New Naturalist: 6), 1947; 16/- net.

The Scottish Highlands are primarily the product of their geology and climate, which are such that cultivation is limited to alluvial and other occasionally favourable areas, while the mass of the country is given over to mountain grassland, peat moor, and bog, where the steep slope, high rainfall, and wind, do not leave bare rock. Man is comparatively scarce, but his sheep—formerly cattle—and deer have affected the vegetation considerably during the last century or two.

The rocks are mostly old and hard, not weathering easily, and in the west, especially near the Atlantic and on the islands, the area of bare rock greatly increases owing to the greater rainfall and higher wind. Sheep crop the herbage more closely than did the cattle, so that the water drains away better; the trees are prevented from regenerating, bracken increases, and the fine pasture which made sheep farming profitable is being destroyed. Heather is burned for the benefit of grouse and sheep, and the sheep and deer destroy the young firs.

The interplay of all these, and other, forces on the wild life of the Highlands, as well as the description of Nature there, is the author's theme. He first outlines the geology and climate, and their effect on

the plant cover in general. He says that tradition says that the climate of the Highlands and Islands has deteriorated during living memory, [but Corstorphine of Arbroath told me that in his lifetime he found the highlands drying up, which he put down to the replacement of the hill cattle by sheep]. The effect of the high winds and Atlantic gales is emphasised, and to the Southron needs to be: in West Sutherland I once unsuccessfully sought a sandy strand marked on the map, to be told by a local that all the sand was blown away one night by a gale.

The relief and scenery is then described, under five heads. The plates give a good picture of what the visitor may expect—a wild beautiful country, mostly hill and moor, where one may walk all day and meet nobody. It is a pity that the colours are not exactly those which one knows, but colour printing has still some way to go before it depicts scenery satisfactorily. I do not agree with the author's protest that the Outer Hebrides are not treeless. They *are* essentially treeless, as anyone who knows them well will agree. Even the trees planted at Stornoway have a hard time, and *native* trees are limited to a few birches, rowans, and aspens in a few sheltered gullies. The winter gales, which as in Connemara make bare a high proportion of rock on slopes, prevent tree growth except for a few sycamores and planted conifers, and to one returning from a few weeks' visit to the Islands the mainland looks as if a green cloth had been spread over the rocks, and birch woods at first seem astonishing novelties. I also take exception to the author's stress on " arctic " affinities of the highlands. The existence of a few species which can grow in the true arctic flora—and here mostly limited to the highest tops—does not make the vegetation more than boreal. Such species grow with others which cannot grow in the botanical arctic, which is not determined by the line of the Arctic Circle, and this stress of arctic affinities strikes a false note to one familiar with the real arctic flora.

The effects of man are then considered—the biggest one being the destruction of the ancient forests within historic times. He rightly emphasises the need for protecting and assisting the endemic variety of Scot's Fir [Scot's Pine is a mere botanist's name: fir is cognate with fire, for which the wood is used], as the few remains of its forests are often in serious danger, and most planting is of the non-endemic variety. Wars were the chief cause of forest destruction, and now felling; sheep and deer prevent the regeneration which cattle permitted. The larger mammals have suffered as severely as the forest: each is dealt with in turn. Birds have often suffered in consequence, but the Great Auk was lost by man's stupidity. Fortunately the Grey Seal has survived till man has become civilised enough to protect it. The effects of man's sporting activities and his establishment of deer forests and grouse moors are described, and the plants of deer forests receive some mention. The evils of overburning of heather are set out. The birds of the area are dealt with one by one. Other groups of animals receive some mention, and incidentally a few plants.

The chapters on the life-histories of the Red Deer and Atlantic Grey Seal are interesting but do not concern the botanist. There is a chapter on the woods, but it is concerned as much with animals as with plants and shows that the author is no botanist; there are many errors. In the chapter on the summits of the hills there is more about plants, with far too many mis-spelt names, quite apart from the adoption of the zoological practice of using small initial capitals where botanical rules of nomenclature require capitals. Pages 150-151 reach the limit in an amazing compilation of errors: the author is evidently not familiar with his subject.

Sagina nivalis is not (p. 150) found " in the courses of tiny streams ": *Menziesia coerulea* does not grow on a " summit ": *Saxifraga cernua* is included among the " fairly common and most beautiful flowers of the tops," whereas it rarely flowers, is not beautiful, and is limited to a few square yards on one Ben: our *Erigeron* is not *E. alpinus* but *E. borealis*: *Arctostaphylos Uva-ursi* does *not* (p. 151) " go very high ": *Arctostaphylos alpina* does grow in the Arctic, but should not be termed " very much an arctic plant " as it occurs in the Pyrenees, Apennines, and Carpathians: *Vaccinium uliginosum* is not a plant of " high meadows," and there never was any question of its replacing *V. Myrtillus*: Cloudberry has *orange* fruits, not " red ": and, finally, the Crowberry common in " alpine grassland " is *Empetrum hermaphroditum*, not *E. nigrum*, which keeps to lower elevations.

The chapter on " The Shore, the Sea Loch and the Shallow Seas " has more of plants, and more errors. The shore Orache is not *Atriplex patula* but *A. glabriuscula*. The Sea Campion is called Bladder Campion (*Silene "maritimus"*). *Salicornia* is not mentioned as a constituent of salt marsh, nor are many other species which are there: the peculiar sheep-cropped " billiard table " marshes, pink with flowering *Armeria* at the heads of sea lochs, merit better description, as do the wonderful flowery " machairs " of the west of Scotland, with their thousands of Frog and other orchids, Thalictrums, and a host of species not mentioned in his list. Among the sand binders with marram we find " Sea purslane (*Atriplex portulacoides*)"! possibly *A. laciniata* often common on the foreshore but not a sand binder; and the common northern sand-binders—*Honkeneja peploides*, *Potentilla Anserina*, and others which surprise the southerner—are not mentioned. *Carex arenaria* " does its bit," but it does not do much! The sea-weed zonation is described, but the abundance of the true *Zostera marina* in the Sound of Harris—a remarkable sight—is not noted. The importance of sea-weed in Island cultivation is mentioned but not the probable effects of its recent removal in quantity for industrial purposes, which may produce quick money but a bad future for cultivation. [However, as there is no bakery in a large part of the Long Island—bread comes to South Uist from Glasgow and meat to North Uist from Dingwall—the Islands may manage without any cultivation, perhaps!] It seems a pity to refer to the sea-weed " *Lithothamnion* " [is it that?] as " coral," even if " not made

by the coral polyps '' : it may be so colloquially, but in such a book this should be corrected, not endorsed. The fish (especially herring) do not concern us here. The chapter on The Suboceanic Island is of interest to all who love islands, and there are some nice illustrations. The flora of North Rona is listed, but it is not right to refer to the species not noticed by Atkinson as " losses."

We end with Lochs and River Systems; a little botany but not good, and the usual crop of errors in names and of omissions. At the end of the few pages of Conclusions the author remarks that " the search for accurate knowledge, surely, is a cornerstone of morality," which makes one wonder why he, with so many right ideas, is so inaccurate. The bibliography of 12 pages is useful but not, of course, exhaustive. None of the distribution maps concerns plants.

I have found the book difficult to review. It is so well written, so full of enthusiasm, so stimulating, so pleasant to read and, like the rest of the series, so well produced—except for four loose pages (the same in three copies seen) which may get lost—and well illustrated. It fulfils many of the aims of the series as set out by the publishers. It is therefore the greater pity that it was not revised by suitable readers before it was printed: the author needed a botanical collaborator. If this review seems to be harping on errors it must be emphasized that the editors set as their aim " a high standard of accuracy." Botanically speaking the book is inadequate, and an adequate account of the vegetation of the area is sadly needed as that given by Tansley in his Vegetation of the British Isles also showed unfamiliarity with the area. Even the plates are not free from error: there is (pl. VIIb) a nice view of Mealisval labelled Suinaval, to take which the photographer would almost have had to make a *volte face*! I could multiply the tale of errors and some are bad: to one who knows both it is rather ridiculous to say that the roadsides about Elphin and Cnochan are like the verges of an English lane: there cannot be any Alpine Hawkweed on Tanera: Aspleniums on tree trunks are presumably Polypodies, and so on. But one does not expect a Scot to pass " Rannock," or to call his Wild Hyacinth the " Bluebell (*Scylla nutans*)" [*sic*], and the Bluebell of Scotland the Harebell (*Campanula*—or should it be Charybdis?). No: there are really too many errors in a book meant for the general reader who cannot be expected to recognise them, though he will read with pleasure and not regret his purchase.

A. J. WILMOTT.

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are invited both from Members of the Society and others. They should have a bearing on the taxonomy or distribution of British Vascular Plants or Charophytes. Papers should preferably be typed, but clearly written MSS can be accepted. They should be double-spaced and written or typed on one side of the paper only. The form adopted in this part should be used for citations and references. Full references should be put at the end, except where special reasons exist (e.g., the citation of place of publication of a plant name) or in very short papers. Illustrations, which may take the form of line drawings or photographs, will be considered for publication. Twenty-five separates of each paper are given free to the author, and further copies may be obtained on payment; requests for extra copies should be made when proofs are returned. Papers should be sent to the Editor, Dr E. F. Warburg, Druce Herbarium, 9 Crick Road, Oxford.

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These should include date of birth and death, summary of life so far as events have a bearing on botanical work, whereabouts of herbarium and any manuscripts and chief botanical publications. Offers to write obituary notices may be sent either to the Editor or to Mr J. E. Lousley, 7 Penistone Road, Streatham Common, London, S.W.16.

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SEVENTH INTERNATIONAL BOTANICAL CONGRESS, STOCKHOLM, JULY 1950

Communication No. 2 from the Organization Committee of the Seventh International Botanical Congress in Stockholm 1950 as well as preliminary application forms for those interested in taking part in the Congress are available on application to the Hon. General Secretary, B.S.B.I.

[Continued on Inside Back Cover]

COELOGLOSSUM VIRIDE × ORCHIS FUCHSII ON THE WILTSHIRE DOWNS

By J. D. Grose.

In June 1946 an *Orchicoeloglossum* was gathered on Bishopstone Downs, North Wilts, v.-c. 7, by Mrs M. le F. Shepherd, and submitted in a fresh state to Mr H. W. Pugsley, who identified it as *Coeloglossum viride* (L.) Hartm. × *Orchis Fuchsii* Druce. A few days later a second specimen was found by Mrs J. D. Grose on the Wansdyke near Horton Down, North Wilts, v.-c. 7. This was a larger, more robust plant, but agreed in all essential characters with the Bishopstone hybrid. The Wansdyke plant flowered again in 1948. Specimens are preserved in Herb. Pugsley (now in Herb. Mus. Brit.) and Herb. Grose (No. 5102) respectively.

Since these plants differ widely from others which have been referred to the same combination (see particularly H. McKechnie, 1918, *B.E.C. 1917 Rep.*, 180), a detailed description of the living plants is given. Particulars in brackets refer only to the Wansdyke, and those outside to the Bishopstone hybrid; when brackets are omitted the characters apply equally to the two plants.

Stem 24 (33) cm. high, stout, slightly hollow, ridged and almost quadrangular. Leaves suberect, ± recurved. Lowest leaf 7 (9.5) × 2 (3) cm., elliptical (broadly elliptical), acute, keeled; second leaf 6 (8) × 1.5 (2) cm., broadly lanceolate; third leaf 4 (6) × 1 cm., lanceolate, very acute; uppermost leaf 3 (5) × 0.5 (0.75) cm., lanceolate, very acute; the lower leaves with faint ring spots, the upper with faint solid spots. Bracts slightly exceeding flowers, very acute, green, keel slightly purplish. Sepals 8 mm. long; the upper wholly pale purple outside, greenish-yellow tinged with purple inside, strongly arched, giving an inclination to the flower as in *C. viride*; the lateral greenish-yellow outside, half purplish and half greenish-yellow inside with a sharp line of distinction between the colours (greenish-yellow with purplish margins and tips), directed forwards with the subacute tips suddenly bent outwards. Upper petals connivent and overlapping under the sepal, whitish-yellow (pale pink) with a very narrow purplish border. Labellum 9 (10) mm. long, 7 (6) mm. broad, strongly deflexed, greenish above, pink below with two oblong, almost parallel, well-defined (strongly defined) blotches, sometimes with pale centres. Central lobe small (rather small), blunt (rather acute), 1 (1.5) × 1 mm., slightly shorter than (equalling) the rather broad (rather narrow) exterior lobes, directed forwards. Ovary dark purple, streaked with green. Spur 3 mm. long, pink, obtuse, curved outwards. Flowers about 22 (40). Spike 5 (11) cm. long, with many flowers still unopened, flexuous, 3 (3.5) cm. broad at base.

The general appearance was of *O. Fuchsii* with a greener coloration and with a more pronounced inclination of the flowers.

The presence of faint ring spots on the lower leaves suggests at first some possibility of the influence of a Marsh Orchis, but there is no marsh within many miles of either locality, and the character sometimes occurs in luxuriant specimens of *O. Fuchsii*. There remains consideration of *O. ericetorum* (Linton) E. S. Marshall as the Spotted Orchis parent. This species, also, is rare in Wiltshire and does not occur in the neighbourhood of Bishopstone or Horton Downs. Its influence would be expected to produce a faintly-spotted labellum as opposed to the very definite line-markings of the two specimens, and perhaps a cylindrical rather than sub-pyramidal inflorescence. The distinct central lobe of the labellum (particularly of the Wansdyke plant) seems to be good evidence of *O. Fuchsii*. Mr A. J. Wilmott has examined the Wansdyke specimen and thinks that the suggested naming is the most obvious interpretation. He draws attention to the resemblance to a plant in Herb. Mus. Brit. labelled " *Habenaria viridis* × *Orchis maculata* " from Long Witton, Northumberland (see J. Britten, 1921, *J. Bot.*, **59**, 76). Comparison with the Winchester plant described and figured (McKechnie, 1918, *loc. cit.*) shows a very close correspondence in the coloration of all organs. A most striking difference, however, is apparent in the size and luxuriance of the Wiltshire plants, for the Winchester hybrid reached only 13.5 cm. and had a spike of only six loosely-placed flowers.

In 1949, two specimens were found on Bishopstone Downs by Mr H. W. Timperly.

ARTEMISIA VERLOTORUM LAMOTTE AND ITS OCCURRENCE IN BRITAIN

By J. P. M. Brenan.

INTRODUCTION

The recognition of *Artemisia Verlotorum* Lamotte as a distinct entity in Britain was made independently in 1938-9 by Mr Iolo A. Williams and the late Mr Francis Druce, who had observed it at Ham Pits in Surrey, and by Mr G. M. Ash, who had for some years known a patch of it near Godalming, Surrey. The obvious relationship with *A. vulgaris* L., and the fact that in Britain the two normally grow in company, at first suggested the possibility of *A. Verlotorum* being no more than a very extraordinary sport of common mugwort. Careful investigation has shown that there are numerous and taxonomically important characters separating the two, and I am left in no doubt that our British plant is a perfectly distinct species from *A. vulgaris*, and that it is certainly conspecific with continental *A. Verlotorum*.

Although brief notes have appeared (Lousley, 1946, 1947; Kent, 1947, 1948) on the occurrence of *A. Verlotorum* in Britain, the facts that its history in this country extends back over at least 40 years, and that it is without question a plant here to stay, make desirable a fuller treatment of the taxonomy, distribution, and history of this outstandingly interesting species.

BIBLIOGRAPHY

There must be comparatively few species of plants discovered as recently as 1873 which have in so short a time given rise to so formidable a spate of literature as has *A. Verlotorum*—literature remarkable for its bulk, its controversial content, and its very wide dispersal. I have made the bibliography given at the end of this paper as complete as I could, but even so have little doubt that there are additional references that I have missed.

This is a convenient opportunity of saying how deeply grateful I am to Mr N. Y. Sandwith for numerous bibliographical references that I might otherwise have missed, and who has sent *précis* and excerpts of various papers not available to me. I must also thank Mr A. H. G. Alston, who has kindly verified certain bibliographical references in the library of the British Museum (National History).

TAXONOMIC HISTORY OF A. VERLOTORUM

The ravelled taxonomic history has been recounted more than once, in English (Hultén, 1930 A) and in Italian (Pampanini, 1923 A, 1933 A); so that merely a brief outline must suffice here.

In 1873 *A. Verlotorum* was observed in eastern France simultaneously by Verlot at Grenoble and by Lamotte at Clermont-Ferrand. Verlot (1875) provisionally identified his plant with *A. umbrosa* Turcz., but Lamotte, having established the identity of the Clermont and Grenoble

plants, challenged Verlot's determination and described the plant as a new species, *A. Verlotorum*, named in honour of the brothers Verlot (Lamotte, 1876). The next development was that Bonnet (1883), without giving his reasons, sank *A. Verlotorum* as a synonym under *A. selengensis* Turcz. ex Bess. Fiori and Paoletti (1903) were apparently the first to distinguish *A. Verlotorum* in Italy, but described it as a variety of *A. vulgaris* L.—var. *angustisecta*. Béguinot (1917), apparently ignorant of the earlier taxonomic work on the plant, described an Italian gathering as a new variety (var. *suaveolens*) of *A. vulgaris* L., and in the same year Saccardo described it as *A. vulgaris* L. var. *odorata*. The task of straightening out this confusion fell to Pampanini, who in 1923 started his exhaustive series of papers on *Artemisia Verlotorum* Lamotte. To summarise here the contents of these papers would not only take too long but would be out of place, as his researches into *A. Verlotorum* led him to no less than a lengthy and critical revision of the genus *Artemisia* in eastern Asia. In the first paper (1923 A), however, Pampanini discusses the relationship of *A. Verlotorum* both with *A. umbrosa* and with *A. selengensis*, concluding that, after examining authentic material of the two last-named species, *A. Verlotorum* is distinct from both. For a discussion of the distinguishing characters reference should be made to the original paper.

As a personal comment on these conclusions, I have myself examined a specimen of *A. selengensis* in the Fielding Herbarium at Oxford, collected and annotated by Turczaninow himself ("*Artemisia Selengensis* mihi. In insula Selenga ad Selenginsk. 1829. Turcz."), and I cannot help feeling surprised that *A. Verlotorum* should for so long have been misidentified with *A. selengensis*. Turczaninow's specimen, and another from Dahuria which is clearly conspecific, and mounted on the same sheet, differ from *A. Verlotorum* in the following points (among others): stems rapidly becoming quite glabrous; leaf-segments narrower, very finely and remotely denticulate, with non-translucent venation invisible on lower surface; stipuliform leaf-lobes usually absent; upper leaves simple; inflorescence-branches suberect and almost straight, not arcuate-divaricate; capitula subglabrous outside.

Authentic material of *A. umbrosa* at Kew, received from Turczaninow, does not appear to be the same as *A. Verlotorum*, the whole plant being more downy, with the upper leaves all entire and the basal stipuliform lobes lacking.

To sum up, then, there appears to be no reason to doubt that *A. Verlotorum* Lamotte is the correct name for the plant, and that it has been misidentified with *A. umbrosa* and *A. selengensis*. In spite of Pampanini's papers the name *A. selengensis* was in use for *A. Verlotorum* as recently as 1929, by Jaquet.

A citation of *A. Verlotorum*, its synonyms, and the principal taxonomic works and papers in which they have been used, follows:

ARTEMISIA VERLOTORUM Lamotte (1876), Coste (1903), Pampanini (1923 A, 1925, 1926, 1927, 1929, 1930, 1933 A), Gams (1929), Hultén

(1930 A, excluding Kamtchatka plants), Montelucci (1934 A), Chiosi (1937), Cabrera (1941), Vignoli (1945), Fournier (1946).

A. umbrosa [non Turcz.] Verlot (1875).

A. selengensis [non Turcz. ex Bess.] Bonnet (1883), Rouy (1903), Albert et Jahandiez (1908), Defillon (1922), Ducellier & Maire (1923).

A. vulgaris [non L.] Battandier (1888), Parodi (1926).

A. vulgaris L. var. *umbrosa* Verlot ex St. Lager in Cariot (1889).

A. vulgaris L. var. *angustisecta* Fiori & Paoletti (1903), fide Fiori (1927).

A. vulgaris L. var. *Verlotorum* (Lamotte) Battandier & Trabut (1904).

A. vulgaris L. subsp. *selengensis* [non (Turcz. ex Bess.) Thell.] Thellung (1912), Voigt (1920), Schinz et Thellung (1923).

A. vulgaris L. var. *odorata* Saccardo (1917), fide Fiori (1927).

A. vulgaris L. var. *suaveolens* Béguinot (1917).

A. vulgaris L. var. *vulgatissima* [non Bess.] Manganaro (1917).

A. vulgaris L. var. *selengensis* [non (Turcz. ex Bess.) Fiori] Fiori (1921).

A. Verlotorum Lamotte var. *typica* Pampanini (1929, 1933 A).

A. Verlotorum Lamotte var. *typica* Pamp. f. *genuina* Pampanini (1933 A).

The above synonymy is that of the common adventive form of *A. Verlotorum*—var. *typica* Pamp. f. *genuina* Pamp. The f. *genuina* is contrasted with f. *vestita* Pamp. (1933 A), which has the capitula cottony-tomentose at flowering time, and is so far recorded only from Tuscany.

ILLUSTRATIONS

A. Verlotorum: Bonnier (1921, t. 290, fig. 1442b, coloured plate of habit); Fiori (1921, t. 3482 (1) [not seen]); Molfino (1926, t. IX, photograph of herbarium specimen); Gams (1929, pp. 631-2, figs. 342-3, habit and overwintering rosette); Pampanini (1933 A, p. 193, fig. 3*, upper part of inflorescence, p. 194, fig. 4*, lower part of inflorescence, p. 220, fig. 19, median cauline leaves); Cabrera (1941, p. 285, fig. 89, habit drawing, very good).

References to the following illustrations of related species with which *A. Verlotorum* has been confused may be useful:—

A. umbrosa Turcz.: Pampanini (1929, p. 536, figs. 79-80, median cauline leaves; 1933 A, p. 187, fig. 1, authentic herbarium sheet).

A. selengensis Turcz. ex Bess.: Pampanini (1929, p. 532, figs. 26-30, median cauline leaves; 1933 A, p. 188, fig. 2, authentic herbarium sheet).

A. unalaskensis Rydb. (*A. opulenta* Pamp., *A. Verlotorum* [non Lamotte] Hultén): Hultén (1930 A, pp. 498-503, figs. 2-5, photograph of specimen, drawings of subterranean parts, leaves and flowers).

A. vulgaris L.: Hultén (1930 A, p. 497, fig. 1, subterranean parts).

*Figs. 3 and 4 are duplicated in Pampanini (1926) as figs. I and II.

THE NATIVE COUNTRY OF A. VERLOTORUM

To those who accepted *A. Verlotorum* as a synonym of *A. umbrosa* or *A. selengensis* this matter gave no difficulty, since the two last-named species are indigenous to Russia and Manchuria. Gams (1929) mentions that Christ even went so far as to coin for it the vernacular name "Bolschewistenbeifuss"—"Bolshevik Mugwort"! The native country of *A. Verlotorum*, however, was unknown at the time of its discovery and remained so until Pampanini investigated the question. In his second Contribution (1925) he ingeniously argues that the sterility of the achenes, the late flowering, the strong smell, and the continuance of vegetative growth through winter are against its being a northern plant brought into a milder climate, and postulates a possible American origin, finding possible allies in Mexico, New Mexico and Arizona, especially *A. Ghiesbreghtii* Rydb. of Mexico. A theory of introduction during the Franco-Mexican war of 1862-1867 follows.

However, in the third Contribution (1926) further consideration of the climatic requirements of *A. Verlotorum* lead him to search for its native home in temperate regions with maximal rainfall in summer (thus not in America), and he looks favourably upon southern and eastern Asia as likely areas. His revision of the Asiatic species in this (1926) and the two following Contributions (1927; 1929) revealed various close relatives of *A. Verlotorum*, especially from China, and in the fifth Contribution (1929) he fits in *A. Verlotorum* among the Asiatic species, distinguishing three varieties var. α *typica* Pamp. (our European plant), and two others confined to China. No specimens of typical *A. Verlotorum* were at that time known from China.

While the fifth Contribution was in the press, Hultén (1930 A) announced that he had discovered the long-sought native home of *A. Verlotorum* in Kamtchatka, where it was alleged to be abundant, extending along the Pacific shore of Asia from the Commander Islands and northern Kamtchatka southwards at least to northern Japan (Hokkaido) and probably also in Saghalin. This paper called forth a rapid reply by Pampanini (1930), to whom Hultén had sent specimens from Kamtchatka. After a lengthy discussion Pampanini concludes that Hultén's *Artemisia*, although a close ally of *A. Verlotorum*, is not that but *A. opulenta* Pamp. Hultén (1937) accepted Pampanini's verdict but sank *A. opulenta* Pamp. under *A. unalaskensis* Rydb. The native home of *A. Verlotorum* was thus as doubtful as before.

The final triumph for Pampanini's theories came when he was able, in his seventh (and last) Contribution (1933 A), to announce that among herbarium material sent to him for naming from Berlin he had found a specimen of *A. Verlotorum* var. *typica* from Ta-tsien-lu in the Province of Si-kang in S.W. China collected by J. A. Soulié in 1894.

To sum up the present position, typical *A. Verlotorum* is known from the above locality in S.W. China, while varieties occur in Hu-peh, northern Shen-si and Sze-chwan in central and south-central China.

For conjectures about how *A. Verlotorum* may have been introduced into France during the French military operations in China between 1856 and 1873, see Pampanini (1933 A).

INTRODUCTION AND SPREAD OF A. VERLOTORUM IN COUNTRIES OTHER THAN ENGLAND

Although *A. Verlotorum* as a native plant seems to have a relatively restricted distribution, yet as an introduction it has become remarkably widespread, now occurring in three continents in addition to its native Asia.

To keep this account within reasonable limits only brief notes and references to literature will be given.

(a) *Europe*

(1) FRANCE. First recorded in 1873 at Clermont-Ferrand (Puy de Dôme) and Grenoble (Isère). By 1903 it extended from Paris to the Mediterranean and was spreading rapidly. Now extends from Ille et Vilaine, Somme, Yonne and Haute Saône to Alpes Maritimes, Var, Bouches du Rhône, Hérault and Pyrénées Orientales, and is still spreading. Jovet (1941) says that *A. Verlotorum* is now much more abundant in the south-west than *A. vulgaris*. See Verlot (1875), Lamotte (1876), Revel (1885), Parmentier (1895), Cariot & Saint Lager (1897), Rouy (1903), Coste (1906), Albert & Jahandiez (1908), Thellung (1912), Héribaud-Joseph (1915), Jovet (1940, 1941), Braun-Blanquet (1945), Fournier (1946), Nehou (1948).

(2) GERMANY. Only known from the shores of the Bodensee (Lake of Constance) (Gams, 1929).

(3) SWITZERLAND. Recorded from Cantons Waadt, Freiburg, Bern Genf, and Tessin, also doubtfully from Canton Zürich. See Thellung (1907, first records for Switzerland), Voigt (1920), La Nicca (1922), Schinz & Thellung (1923), Gams (1929), Jaquet (1929), Becherer (1947).

(4) ITALY. Recorded from Piedmont, Lombardy, Tirol, Venetia, Emilia, Tuscany, Marche and Latium. See Béguinot & Mazza (1916), Béguinot (1917), Saccardo (1917), Fiori (1921), Cozzi (1922), Ugolini (1923), Pampanini (1923 B, 1924, 1934, 1936), Gams (1929), Montelucci (1934 A, 1934 B, 1935), Chiosi (1937), Cobau (1940).

(5) SARDINIA. Recorded by Pampanini (1933 B).

(6) RUSSIA. According to Gams (1929) only known as a weed in the Nikita Garden in the Crimea.

(b) *North Africa*

(7) ALGERIA. A patch noted at Boufarick in 1879. By 1904 abundant and spreading in the Mitidja area. See Battandier (1888, 1904), Battandier & Trabut (1904).

[(c) *North America*]

[(8) U.S.A. Recorded from Oregon (Rydberg, 1916), but in error (Hall & Clements, 1923; Pampanini, 1925).]

(d) *South America*

(9) ARGENTINA. First recorded in 1917 near Buenos Aires, and by 1928 had spread all over the warm temperate region of the country, extending from Salta, Tucumán and Mendoza to Pampa and the Rio Negro. See Manganaro (1917), Hauman (1925), Molfino (1926, 1928), Parodi (1926, 1930), Cabrera (1941).

(10) URUGUAY. Recorded from Dept. of Canelones (Molfino, 1928; Herter, 1930).

DESCRIPTION OF A. VERLOTORUM

The following description has been drawn up entirely from British specimens. The very few points in which Continental material differs will be mentioned after the description.

ARTEMISIA VERLOTORUM Lamotte. *Perennial herb*, aromatic, spreading extensively by rhizomes from which arise barren stems bearing leaves alone and taller fertile stems bearing both leaves and inflorescences. *Fertile stems* up to 2 m. high, generally about 1-1.5 m. high, up to 7 mm. in diameter, profusely but shortly branched above in the region of the inflorescence, otherwise subsimple, strictly erect, rigid, conspicuously sulcate-angled and deeply so when young, solid, at first densely and shortly pubescent with simple flexuous grey hairs among which numerous minute short cylindrical or subclavate glands are mixed, pubescence later becoming thinner but always ± persistent; pith small, central, white; cortex and connecting tissue relatively broad and green; epidermis deep dull purple at least on the exposed side. *Leaves* alternate, lower ones broadly oval to subcircular in outline, up to about 14 cm. long and wide, sessile, simply or bi-pinnatipartite; segments opposite, in 4-6 pairs, the lower ones small, entire, with the lowermost 1-2 pairs inserted at the base of the " petiole ", very small and stipuliform, the upper segments much larger, linear to linear-lanceolate, up to about 9 cm. long and 1.3 cm. wide but usually smaller and about 4-5 × 0.5-0.8 cm., gradually tapering to an acute apex, obscurely and slightly repand, entire or sometimes with 1 (-2) pairs of shorter secondary segments which are entire or sometimes with a single tooth; margins narrowly revolute; surface above deep green and glabrous or subglabrous except on the impressed midrib, beneath densely and shortly grey-white-tomentellous all over except for the greenish midrib; lateral nerves about 10-12 (-15) on each side, somewhat impressed above, slightly prominent beneath; midrib and veins translucent; median and upper (inflorescence) leaves gradually becoming smaller and less divided, with elongate-linear and always entire segments; the uppermost leaves trifid or quite simple, small or very small. *Inflorescence* profuse, ample, very leafy, narrowly pyramidal, up to about 58 cm. long and 20 cm. wide, with many arcuate-divaricate primary lateral branches, not clearly separated from the lower primary lateral branches which produce secondary more reduced inflorescences towards their ends; upper primary lateral branches up to about 20 cm. long, very leafy, bearing axillary capitula mostly one per axil and sessile or sub-

sessile, or (especially on the lower branches) few (about 2-5) together and basipetally arranged on very abbreviated secondary lateral branches; occasionally (? on weak shoots) whole inflorescence subsimple and racemiform. *Capitula* congested towards branch-apices, more spaced below, mostly secund, subtended by and exceeded by (even near the branch-apices) the trifid or simple uppermost leaves (bracts), ellipsoid, 3.5-5 mm. long, 2.5-3 mm. wide, heterogamous with 9-12 outer ♀ florets, 2-6 inner ☿ florets, and 6-11 (or possibly more) central apparently abortive ± rudimentary florets; flowering takes place in centripetal succession; occasionally all the ☿ and part of the ♀ florets apparently abortive. *Phyllaries* 13-19, in 3-4 ill-marked series, all thinly arachnoid-pubescent outside; outer ones ± convex, triangular to ovate, acute, 1.25-2.5 mm. long and 0.8-2 mm. wide, with green central part and relatively narrow hyaline margins; inner grading to elliptic or elliptic-obovate, obtuse or rounded, very convex, to about 4 mm. long and 1.5-2 mm. wide, green about the midrib and with broad hyaline or sometimes red-purple-tinged minutely erose margins which have a beautiful metallic ± golden lustre. ♀ *florets* small, tubular, 1.5 mm. long, about 0.3 mm. in diameter, greenish-white or red-purplish above, with sessile glands outside and very short lobes about 0.1-0.2 mm. long; anthers 0; style exceeding the corolla, filiform, glabrous, 2 mm. long, divided at apex into 2 yellowish-white filiform or slightly flattened segments 1.25 mm. long; ovary slightly curved, glabrous, 0.75-1 mm. long and 0.3-0.4 mm. wide. ☿ *florets* larger, infundibuliform, 2.5 mm. long, 0.4-0.5 mm. in diameter at base, gradually enlarging upwards to 0.9 mm. diameter towards apex, basal part with numerous sessile glands, upper part eglandular or almost so except on lobes, shining and bright red-purple, passing through a narrow yellowish zone to the green basal part; stamens with glabrous filaments, 0.6 mm. long, and yellow anthers, 1.5 mm. long in all and 0.4 mm. wide, the connective produced at apex into a hyaline triangular subacute appendage 0.5 mm. long, its top on a level with the ends of the corolla-lobes; style as in ♀ florets but not exceeding the corolla and with segments 0.75 mm. long; ovary as in ♀ florets. *Rudimentary florets* minute, pale. *Achenes* not as yet seen in Britain.

Study of Italian and Swiss specimens in the Fielding Herbarium at Oxford enables the above description to be extended in the few following points:—Secondary segments of lower leaves sometimes with a pair of teeth. Capitula towards ends of primary lateral branches of the inflorescence occasionally not exceeded by the bracts, when mature ± ellipsoid or shortly oblong-hemispherical and up to 4 mm. wide. Inner phyllaries up to 4.25 mm. long. Style branches of ♀ florets up to 1.5 mm. long. ☿ florets up to 10-11. Abortive florets sometimes fewer. So far I have not seen any Continental specimens with achenes.

Most of the above points can be attributed to the milder climate of the Mediterranean region, allowing fuller development of the capitula than I have so far seen in this country.

COMPARISON OF A. VERLOTORUM WITH A. VULGARIS

Artemisia vulgaris	*Artemisia Verlotorum*
Flowering season early (July-September), only an occasional straggler remaining in flower later.	Flowering season late (October-November—?), often curtailed by frost.
Plant caespitose or with short underground shoots.	Plant with long rhizomes.
Young stems sulcate.	Young stems more deeply so.
Stems usually glabrescent or with a very sparse persistent pubescence.	Stems usually with a denser persistent pubescence.
Stem in section showing a large, white, central pith and a narrow, green zone of connecting tissue + cortex.	Stem in section showing a small, central pith and a relatively broad zone of connecting tissue + cortex.
Upper primary segments of lower and median cauline leaves on flowering stems with 2-4 pairs of serrate or lobate secondary segments.	Upper primary segments of lower and median cauline leaves on flowering stems linear or linear-lanceolate, entire or with a single secondary segment or at most 1(-2) pairs of secondary segments which are entire or sometimes with a single tooth (rarely a pair of teeth in Continental specimens).
Midribs and lateral nerves of leaves usually translucent by transmitted light; smaller veins obscure (in living and dried plants).	Smaller veins, as well as midribs and lateral nerves beautifully and clearly translucent by transmitted light (in living and dried plants).
Segments of upper leaves usually comparatively short, lanceolate to oblong or linear.	Segments of upper leaves conspicuously elongate linear-lanceolate to linear.
Inflorescence usually sparsely leafy except towards base.	Inflorescence very leafy in all parts.
Inflorescence-branches strict, straight or nearly so.	Inflorescence-branches arcuate-divaricate.
Bracts mostly shorter than the capitula except in lower part of inflorescence-branches.	Bracts distinctly exceeding the capitula even near ends of branches (in one Continental specimen capitula not exceeded by bracts towards branch ends).
Primary lateral branches of the inflorescence bearing for the most part ± abbreviated secondary lateral branches upon each of which about 2-20 capitula are aggregated; capitula only borne singly near extreme ends of primary lateral branches.	Primary lateral branches of the inflorescence bearing for the most part solitary, axillary capitula; occasionally, towards base of primary lateral branches, usually very abbreviated secondary lateral branches, bearing few (about 2-5) capitula, may be produced.
Capitula mostly campanulate or slightly narrowed above, rarely ellipsoid, 3-4 mm. long, 2-2.5(-3.5) mm. wide.	Capitula ellipsoid (rarely oblong-hemispherical), 3.5-5 mm. long, 2.5-3(-4) mm. wide.
Phyllaries ± densely arachnoid-pubescent outside.	Phyllaries thinly arachnoid-pubescent outside.
Tube of ♀ florets about 0.2 mm. in diameter.	Tube of ♀ florets slightly wider, about 0.3 mm. in diameter.
5-22 ☿ florets per capitulum, rarely only 2-3; abortive central florets 0-10.	(0-)2-6(-11) ☿ florets per capitulum, usually fewer than in *A. vulgaris*; abortive central florets 4-11, mostly more numerous than is usual in *A. vulgaris*.
Tube of ☿ florets about 0.25 mm. in diameter at base.	Tube of ☿ florets about 0.4-0.5 mm. in diameter at base.
Plant fruiting freely.	Plant very rarely maturing achenes (none yet seen in England).
Plant with normal "mugwort" smell.	Plant with stronger and more pleasantly aromatic smell.

The above comparative table requires certain comments.

The character of the translucence or non-translucence of the venation appears to be constant in *A. Verlotorum* and in British *A. vulgaris*, but I have seen certain Continental specimens of *A. vulgaris* (*Fl. Exsicc. Austro-Hungarica*, *No. 3781*, leg. *Wettstein*, and *Fl. Bellonensis* comm. *Caruel*, 1884), in which the venation is partially translucent, although not so regularly and completely so as in *A. Verlotorum*.

In addition to the above characters, Defillon (1922) has adduced the presence of secretory channels near the outside of the endodermis of the stems as distinguishing *A. Verlotorum* from *A. vulgaris*.

Certain other characters, not mentioned in the above table, have been alleged to distinguish these two species. Stress has been laid (e.g. by Rouy, 1903; Béguinot, 1917; Pampanini, 1925) on the absence of glands on the florets. Hultén (1930) recognised that this was incorrect, but implied that the glands are more scattered in *A. Verlotorum*. Glands are certainly present on the corollas of *A. Verlotorum*, and I can see no difference either in their density or distribution to separate *A. Verlotorum* from *A. vulgaris*.

Schinz & Thellung (1923) contrast the phyllaries of *A. Verlotorum*, described as all ovate and blunt, with those of *A. vulgaris*, described as lanceolate to linear and acute. This appears to be quite imaginary; in both species I find a transition from outer acute to inner rounded phyllaries.

Rouy (1903) contrasts the brownish-red florets of *A. Verlotorum* with the creamy-yellow ones of *A. vulgaris*. But, as every field-botanist in this country knows, it is very rare for our common mugwort to have other than brownish-red florets! It is perhaps worth noting here that Pampanini (1925) records yellowish florets in colonies of *A. Verlotorum* at Florence, though this must be very rare.

Mention should be made also of a character to which attention was first drawn, I believe, by Montelucci (1934 A)—the revolution of the margins of the upper leaves. He emphatically maintains that this is very evident in *A. Verlotorum* but not marked in *A. vulgaris*, and that it has helped him to recognise dried flowering stems of *A. Verlotorum* in the field, when green portions were lacking. I have been unable to convince myself that this character is a satisfactory one, at least as far as England is concerned, and have therefore omitted it from the comparative table; I find that the upper leaves of *A. vulgaris* in this country have frequently markedly revolute margins, but this may not apply perhaps in Italy.

For Pampanini's discussion of the differences between *A. Verlotorum* and *A. vulgaris* see his second Contribution (1925).

BIOLOGY

It should be clear from the preceding portions of this paper that *A. Verlotorum* is a plant of unusual interest in its life-history and reproduction. I have therefore endeavoured to bring together here the

available information, though there are several points that are still doubtful or in need of further study.

Throughout its introduced range *A. Verlotorum* seems to have a very markedly close association with ground disturbed by human activities. In England it is characteristic of sides of roads and paths, railway banks and disturbed waste ground. A similar range of habitat is indicated for France (Jovet, 1940), Italy (Montelucci, 1934 A) and Argentina (Molfino, 1928). Parmentier (1895) notes its occurrence in vineyards, and Battandier (1904) in orange-orchards, gardens, etc. Montelucci (1934 A) has a most interesting and philosophical discussion, based on his experience of *A. Verlotorum* in the field, of the situations that it prefers, laying especial emphasis on the railways, and the strong predilection that he observed for the neighbourhood of the stations. From this and from a previous note by Cozzi remarking particularly the plant's invasion of cemeteries, Montelucci deduces that it requires especially ground rich in organic matter, broken up and allowing thus room for the spread of the rhizomes. At Ham Pits in Surrey I have seen *A. Verlotorum* growing abundantly and luxuriantly on the steep sides of old gravel-pit workings where the ground is unstable and unlikely to be especially rich in organic matter, and I believe that the first requisite for the establishment of the plant is, as Montelucci states, broken soil supporting a still " open " community of plants. Like so many other aliens, *A. Verlotorum* does not seem, in general, to spread into already closed communities, even though these may be seral. As a further comment on its occurrence in open communities we may note Molfino's (1928) remarks on its being detrimental to lucerne crops in the Argentine, and even being regarded as a pest by the cultivators.

A point which Thellung (1912) has noted is that *A. Verlotorum* is frequently accompanied by *A. vulgaris*. This is especially noticeable along the Thames in Surrey, stems of the two species being sometimes mingled in the same clump.

As we have already noted, one of the most striking features of *A. Verlotorum* is its very late flowering season. The statement by Parmentier (1895) that it flowers near Besançon from June to August is unquestionably an error. Montelucci (1934 A) remarks that at Rome it started to flower on September 28th and was practically over by the end of November, and numerous other writers in France, Switzerland and Italy agree in giving the period September-November or a part of it. Schinz & Thellung (1923) extend it to December. In England, although detailed phenological studies have not been made, the onset of flowering appears to be about a month later than at Rome. In October 1942, Thames-side plants were in bud on the 12th, and were just flowering on the 24th, and in subsequent years I have not seen flowers before the latter half of October. It will be obvious that the flowering season and severe frosts frequently coincide; Gams (1929) states that in 1923 and 1924 it failed to reach flowering condition either north or south of the Alps. In England it seems normal for the completion

of flowering to be prevented by frost and I have never seen achenes. *A. Verlotorum* would be an interesting subject for further phenological study, especially its behaviour in exceptionally mild seasons.

The rarity of achenes in *A. Verlotorum* has been repeatedly noted, and the matter is discussed by Pampanini (1925), who remarks that Béguinot had cultivated the plant from seed, but that only a very small number of achenes matured; Molfino (1928) also mentions its propagation by achenes. Whatever the cause of this partial infertility—and the indications are that it is probably climatic—we may safely prophesy that the conditions in England will rarely, if ever, permit *A. Verlotorum* to ripen any achenes.

We are, therefore, faced with the apparent paradox of a plant, very rarely maturing achenes, and unequipped for *long*-distance dispersal, that has spread with astonishing rapidity over much of Europe. It is not easy to explain this fully, but it seems certain that it owes its presence in many places to portions of the rhizome being brought in with earth or ballast; its wide distribution along railways and roads is thus no doubt largely explained. There is no evidence that it has extended its area in England other than by vegetative reproduction, and this will explain its absence from many suitable localities. For further notes on the great ease with which detached portions of the rhizome root, see Vignoli (1945).

Vignoli (1945) has recently discussed the cytology of *A. Verlotorum*. The basic number of chromosomes in *Artemisia* is 9 and Tischler has established that *A. vulgaris* is a diploid (2n = 18). Vignoli studied both mitosis and meiosis in *A. Verlotorum* and found 2n = 54 and n = 27. *A. Verlotorum* is thus a hexaploid, and Vignoli makes various suggestions about its possible origin. The observation of apparently normal meioses seems to show that *A. Verlotorum* is a balanced polyploid without the irregular pairing and disjunction that would be expected in an autopolyploid.

OCCURRENCE AND DISTRIBUTION OF A. VERLOTORUM IN BRITAIN

Since its discovery our knowledge of the area occupied by this species has grown rapidly, and we can probably now define it with tolerable accuracy. That this is so is largely owing to the enthusiastic studies of Messrs D. H. Kent and J. E. Lousley in Middlesex and Surrey respectively; they have kindly placed their records at my disposal in drawing up this section of the paper, and I am most grateful. I must also acknowledge help over certain Surrey localities from Mr E. C. Wallace.

A. Verlotorum is at present known in the vice-counties of Surrey, Middlesex and Hertfordshire, its main area being a wide arc round the western side of London, from Watford and Whetstone in the north to Chertsey and Kingston in the south. In addition, there are four apparently isolated outlying stations in Surrey, to the south and west

of the main area—Ewell, Ripley, Worplesdon and Godalming. I have heard (1949) from Mr D. H. Kent that he has discovered *A. Verlotorum* in two areas of waste ground in Canterbury, E. Kent (v.-c. 15). In one of them it is in company with *Medicago arabica*, *Trifolium minus*, *Arctium minus*, *Dipsacus fullonum* and *Cardaria* (*Lepidium*) *Draba*, and it was in fair quantity in both. This not only adds a new county to its range, but is the most outlying locality from its main London area. How it got to Canterbury is not obvious. One of its habitats here is a bombed site, and it looks as if the *Artemisia* is a comparatively recent arrival at Canterbury.

So far it is unknown from Essex, but it may well spread there in time; also, according to Mr D. H. Kent, it is almost certain to be found in the Iver-Slough area of Buckinghamshire, since it grows within a few yards of the county boundary at Yiewsley. At present it is not possible to know with any accuracy where *A. Verlotorum* started in England, but its great abundance about the Thames on the western edge of London make it very likely that it originated in the Chiswick-Brentford-Hounslow-Twickenham-Richmond area; the oldest known English specimen (1908) is from Hounslow.

A more detailed enumeration of localities and specimens, arranged under vice-counties, follows. (K) denotes that I have seen a specimen in the Kew Herbarium.

v.-c. 15, E. Kent

Two areas of waste ground in Canterbury, 1949, *D. H. Kent.*

v.-c. 17, Surrey. [See Lousley (1946, 1947)]

Districts according to C. E. Salmon, 1931, *Fl. Surrey*

IIIa. New bathing pool, Godalming, 9 Nov. 1946, *G. M. Ash* (K, Herb. Brenan).

IV. Ripley, 28 Oct. 1945, *N. Y. Sandwith* 3180 (K). A clump on roadside verge, Bullswater Common, near Worplesdon, 14 Sept. 1947. *E. C. Wallace & N. Y. Sandwith.*

VII. Locally abundant at Kew and thence along the Thames to Mortlake, 3 Nov. 1942, *N. Y. Sandwith* 3179 (K), 2 Oct. 1944, *E. J. Salisbury* (K), 24 Oct. 1945, *N. Y. Sandwith & J. P. M. Brenan* (Herb. Brenan No. 7235), 3 Nov. 1945, *J. E. Lousley* (K), 16 Feb. 1946, *J. E. Lousley* (K), 15 Jan. 1948, *A. H. G. Alston* (K). Richmond, 1942-1948! Locally abundant between Ham and Teddington, 12 Oct. 1942, *N. Y. Sandwith & J. P. M. Brenan* (Herb. Brenan No. 6806), 8 Nov. 1942, *N. Y. Sandwith* 3178 (K). Between Ham and Kingston, 1942! Large patches on Wimbledon Common, 9 Nov. 1946, *N. Y. Sandwith* (K); also by several roads to the south of the common, near Copse Hill, *Mrs Welch, J. E. Lousley.* Wayside, Howell Hill, Ewell, 16 Aug. 1947, *E. C. Wallace* 6022 (K)—specimen very immature.

v.-c. 20, Hertfordshire

Waste ground between Bushey Heath and Watford, 1947, *D. H. Kent.*

v.-c. 21, Middlesex

[See Kent (1947; 1948), Lousley (1946), Clifton College (1947 ?)]

Districts according to Trimen and Dyer, 1869, *Fl. Middlesex*

I. Between Brockley Hill and Elstree, 1946, *D. H. Kent.* Yiewsley, 5 Oct. 1930, *R. Melville* (K), still there in 1948, *D. H. Kent.*

II. Abundant by the Thames near Chertsey Bridge, 1946, *D. H. Kent.* Roadside near Sunbury Clock Tower, 1947, *Mrs Welch.* R. Thames between Sunbury and Halliford, 1947, *D. H. Kent.* Hampton Court, 1947, *Mrs Welch.* Abundant about Fulwell Golf Course, 1948, *D. H. Kent.*

III. Rough ground near Hounslow, 7 Sept. 1908, *C. G. Green* (Herb. Druce at Oxford, ex Herb. A. Loydell!). Roadside between Bedfont and Hounslow, 1947, *Mrs Welch.* Hounslow Heath and adjoining waste land, 1947, *D. H. Kent.* Railway bank between St Margaret's and Twickenham, 1947, *Mrs Welch.* Near Hayes railway station, 1948, *D. H. Kent.*

IV. Cool Oak Lane, Kingsbury, 1946, *D. H. Kent.* Near Brent railway station, *Clifton College 1945-6 Report.* Bombed site, Church Lane, Willesden, 1948, *D. H. Kent.*

V. Roadside, Perivale, 1947, *D. H. Kent.* Canal-bank, Norwood Green, 1948, *D. H. Kent.* Tip at Hanwell and waste ground, Windmill Lane near Hanwell, 1946, *Mrs Welch & D. H. Kent.* Ealing Common, 1946, *D. H. Kent.* Brentford, 1945, *Mrs Welch.* Gunnersbury station! Hartington Road, Chiswick, 1945, *Mrs Welch.*

VI. Whetstone, 1948, *D. H. Kent.* East Finchley, 1947, *J. E. Lousley.*

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A NOTE ON SPECIES PAIRS IN THE GRAMINEAE

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In *Anthoxanthum*, *Dactylis* and *Phleum* there are pairs of species which differ from one another in minor morphological features but considerably in other respects. The members of each pair differ markedly in chromosome number, one being diploid and the other tetraploid, and they appear also to have somewhat different ecological preferences and geographical distributions.

The species concerned are *Anthoxanthum alpinum* A. & D. Löve (2n = 10) and *A. odoratum* L. (2n = 20); *Dactylis Aschersoniana* Graebn. (2n = 14) and *D. glomerata* L. (2n = 28); *Phleum alpinum* L. (2n = 14) and *P. commutatum* Gaud. (2n = 28). Up to the present only the tetraploids have been found in this country; it is possible that the diploids of the first two pairs may occur, as the tetraploids are common, variable and not sought after by collectors. On the other hand it is very unlikely that *Phleum alpinum* will be found here, since it has a narrower Continental distribution than the other diploids, and *P. commutatum* is so uncommon in this country that it is probable that specimens from every known locality are to be found in the major herbaria, so that it is unlikely that *P. alpinum* has been overlooked.

It is probable that in each pair the diploid has given rise to the tetraploid by a doubling of the chromosome sets. The change from diploid to tetraploid would set up a complete or nearly complete barrier to interbreeding at once and the six species would therefore come into the category of *a*-ecospecies (Valentine, 1948).

In all three pairs, though the distribution of the species in *Anthoxanthum* and *Dactylis* is perhaps not completely known, there is little doubt that the range of the tetraploid is greater than that of the corresponding diploid. For instance, *Phleum alpinum* is abundant in the Alps and occurs less frequently north to the central German mountains, east to the Carpathians and Transylvania, south to Bosnia and Herzegovina, and west to France and the Pyrenees (Nordenskiöld, 1945). *P. commutatum* occurs on the higher mountains of the North Temperate Zone, in the Arctic regions, and is also recorded from the south of S. America and South Georgia. This difference in distribution is the more remarkable since in the Alps, where both species occur, *P. alpinum* is by far the commoner and grows in a wider range of habitats, for instance meadows, roadsides and spruce woods. *P. commutatum* there, as in Scotland, appears to be confined to wet grassy places beside streams and lakes.

In the other two pairs the tetraploid not only has a wider distribution but also a greater range of habitats. *Dactylis Aschersoniana* is a

woodland plant and *Anthoxanthum alpinum* appears to be confined to mountains and to arctic regions, while the corresponding tetraploids occur in many other habitats.

Since it would be of interest to have full and accurate information about the distributions and habitats of these plants, I give a summary of their distinguishing characters, known distribution, etc.

ANTHOXANTHUM ALPINUM A. & D. Löve (1948). Leaves of vegetative shoots 1-3 mm. wide (up to 4 mm. wide in cultivation), usually erect. Inflorescence 1.5-3 cm. long. Spikelets 5-6.5 mm. long; the longer awn 2-3 mm. longer than the upper glume. Pedicels and glumes glabrous. Caryopsis 1.5-1.75 mm. long. The length of the guard cells in mature leaves ranges from 37-42μ. 2n = 10 (Östergren, 1942, Scandinavian material; Tutin, unpublished, Swiss material).

Finland, Iceland, Norway, Sweden, Switzerland.

A. ODORATUM L. Leaves of vegetative shoots (2-)3-5(-10) mm. wide, usually spreading and, in dwarf forms, short in proportion to their breadth. Inflorescence (3-)4-6(-7) cm. long. Spikelets 7-9 mm. long; longer awn equalling or rarely slightly exceeding the upper glume. Pedicels hairy. Glumes with at least a few rather long hairs, sometimes confined to the keel. Caryopsis 2-2.2 mm. long. The length of the guard cells in mature leaves ranges from 48-54μ. 2n = 20 + 6 fragments (Hunter, 1934), 20 (Östergren, 1942; Tutin, unpublished, material from shore of Loch Tummel, Perth).

Europe, N. Africa, N. Asia. Equally common on basic and acid soils and ascending to 3600 ft. in Scotland.

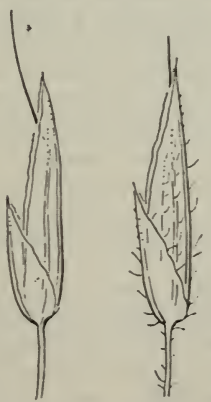

Fig. 1. Spikelets of *Anthoxanthum alpinum* (left) and *A. odoratum* (right). ×4.

The spikelet differences between these two species are shown in fig. 1. In general *A. odoratum* is a larger, stouter plant than *A. alpinum* though, of course, dwarf forms occur. In one of these dwarf forms, from Lizard Downs, W. Cornwall, the spikelets are unusually small (6

mm.) and the awn protrudes a little further than usual, but the pedicels and glumes are pubescent. The culms are 5-20 cm. high and the inflorescence only 13-20 mm. long. The leaves are narrower than usual, having a breadth of 1.5-2 mm., and are very short, none exceeding 2 cm. This plant has not yet been cultivated and, though it clearly belongs to *A. odoratum*, may perhaps be a distinct ecotype.

DACTYLIS ASCHERSONIANA Graebn. Plant in usually rather small, loose tufts. Leaves soft and more or less flaccid, clear light green to yellow-green, 2-3 mm. wide. Culms more slender and shorter than in *D. glomerata*. Sheaths not scabrid, though occasionally sparsely hairy. Panicle more or less nodding, slender; lowest branches filiform. Clusters of spikelets rather lax. Rhachilla between the lowest and 2nd floret more than 1 mm. long, so that the spikelet has a lax appearance. Glumes and lemmas glabrous and smooth or serrulate on the keel. The length of the guard cells in mature leaves ranges from 20-27μ. 2n = 14 (Müntzing, 1937).

Known from Scandinavia, Central and Eastern Europe, the Netherlands and France.

According to Domin (1943), *D. polygama* Horvat. is the earliest name for this species, but further investigation of the type seems desirable before it is finally accepted.

D. GLOMERATA L. Plant usually in large dense tufts. Leaves stiff, greyish- or bluish-green; widest leaves on well-grown plants 5 mm. or more wide. Culms stout and usually tall. Sheaths scabrid. Panicle erect, stout; lowest branches thick and stiff. Clusters of spikelets very dense. Rhachilla between the lowest and 2nd floret less than 1 mm. long, so that the spikelet has a crowded appearance. Glumes and lemmas usually long-ciliate on the keel. The length of the guard cells in mature leaves ranges from 34-40μ. 2n = 28 (Müntzing, 1943).

Müntzing (1937) reports that these two species hybridise though the hybrid is, presumably, sterile. No one of the morphological characters mentioned above, except, almost certainly, the length of the guard cells, can be relied upon for the separation of the two species as, for instance, tetraploid plants with glabrous spikelets occur which, however, resemble typical *D. glomerata* in other respects.

PHLEUM ALPINUM L. Plant often tall (up to c. 60 cm.). Inflorescence usually 4-6 times as long as broad, seldom purple-tinged. Keels of glumes and the awns ciliate with rather long stiff hairs; ratio of length of glume to length of awn c. 1.4-1.6. The length of the guard cells in mature leaves ranges from 32-37μ. 2n = 14 (Gregor & Sansome, 1930).

Alps, mountains of C. Germany, Carpathians, Transylvania, Bosnia, Herzegovina and westward to France and the Pyrenees.

P. COMMUTATUM Gaud. Plant usually short (often less than 20 cm.). Inflorescence seldom more than 2-3 times as long as broad, usually (? always) purple-tinged. Keels of glumes ciliate but awns glabrous or, at

most, with a few short hairs at the base; ratio of length of glume to length of awn c. 1-1.1. The length of the guard cells in mature leaves ranges from 40-48μ. 2n = 28 (Gregor & Sansome, 1930).

Arctic and subarctic from Scandinavia to N. Russia, Siberia, N. America, Greenland, Iceland, Faeroes, Scotland; mountains of C. Europe, Italy, Balkans, Pyrenees; mountains of C. Asia, but rare in the east; mountains of N. America south to New England and Mexico; South Georgia, Patagonia and in the Andes north to about the latitude of Valparaiso.

It appears that in parts of France, at least, the morphological distinctions between these two species are not as clear-cut as they appear to be elsewhere and the relationship between them is similar to that between the two species of *Dactylis* (Litardière, 1949).

It would appear that in these instances the tetraploids have some advantage compared with the diploids, at least in establishing a wider geographical range and, usually, also in greater adaptability to different habitats. It would be interesting to know if a similar relationship exists between the members of other similar pairs.

My best thanks are due to Mr C. E. Hubbard for information about recent papers, particularly those dealing with *Phleum*.

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THE IDENTIFICATION AND DISTRIBUTION OF THE BRITISH WATERCRESS SPECIES

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In the *Comital Flora of the British Isles* (Druce, 1932), Watercress (*Nasturtium officinale* R. Br., *sensu lato*) is recorded as occurring in every vice-county. This plant, which was formerly regarded as being a single species, is now known to be represented in Britain by two distinct species and their hybrid. In consequence, information regarding the British distribution has been rendered obsolete.

The two species were distinguished by Howard & Manton (1945) as *Nasturtium officinale* R. Br. [*sensu stricto*] and *Nasturtium uniseriatum* [sp. nov.] (cf. Hyde, 1948). Airy Shaw (1947) has given good reasons for claiming *Nasturtium microphyllum* as a prior specific name for the latter and has suggested that, pending definite evidence to the contrary, it should be known as *Nasturtium microphyllum* Boenningh. ex Reichenbach, sensu Boreau (1857). (See also Wilmott, 1948.)

IDENTIFICATION

The two species can be readily distinguished by their fruits and seeds (figures 1 and 2; see also figures in Howard & Manton (1946) and Howard (1947)). It is also interesting to note that f. 52 in Fitch & Smith (1944) is of *N. officinale*, while f. 81 in Hutchinson (1945) is of *N. microphyllum*. In both cases the plants can be readily identified from the details of the fruits and seeds which are given in the plates. The hybrid can be distinguished by its short pinched fruits which only set an occasional seed. Care, however, must be exercised in the identification of wild hybrid plants, as, under crowded or very wet conditions, poor development of fruits in *N. microphyllum* has been noted. The hybrid can also be recognised by the fact that it produces very little good pollen.

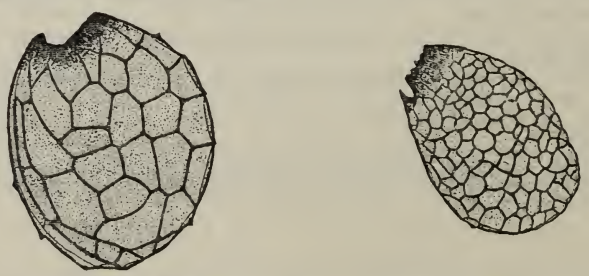

Fig. 2. Seeds of *N. officinale* (left) and *N. microphyllum* (right) (×28).

Unfortunately, apart from the use of stomatal indices (see Rowson, in Howard & Manton, 1946), it seems to be impossible as yet to distinguish between wild plants by any purely vegetative characters, ex-

Fig. 1. Fruiting Branches of Watercress (× approx. ½). Left : *N. officinale*. Centre : *N. microphyllum* × *officinale*. Right : *N. microphyllum*.

cept in the winter when the foliage of *N. microphyllum* (and the hybrid) tends to turn a purplish-brown colour during cold spells.

Recently we have observed a flower character which appears to be useful in distinguishing the two species. In *N. officinale* the anthers have their pollen-bearing surfaces turned inwards (i.e. they are introrse), while in *N. microphyllum* the anthers of the long stamens have them turned outwards when ripe, so that the pollen-bearing surfaces face towards the short stamens (extrorse). It has not been found possible to employ this character in the determination of the hybrid, but it would appear that in this respect it tends to resemble *N. microphyllum* rather than *N. officinale*. Further observations are required to confirm this distinction.

Watercress is recognised as being a very plastic plant, a feature which has in the past led to much confusion. Thus, small stunted plants growing under relatively dry conditions have frequently been identified as "var. *microphyllum*." Many of the sheets which we have examined, labelled var. *microphyllum*, apparently on account of the small size of the leaflets, were found to be the species *N. microphyllum* as distinguished by the characters of the fruits and the reticulation and uniseriate arrangement of the seeds. Others, however, were clearly *N. officinale*, and some the hybrid *N. microphyllum* × *officinale*. The var. *siifolium* Reichb. is a variety of *N. officinale*, but identification based on leaf characters alone would also place specimens of *N. microphyllum* and the hybrid in this type. Several of the herbarium sheets labelled *N. officinale* var. *siifolium* were not in fact *N. officinale*. As yet, it cannot be definitely stated whether *siifolium* is a true genetic variety or merely a growth form. It must, however, be recognised that types of *N. officinale* occur both with narrow and with very broad leaves.

DISTRIBUTION

Certain preliminary records of the distribution of *N. officinale* and *N. microphyllum* have recently been published (Wallace, 1948; see also Riddelsdell, Hedley & Price, 1948). The following lists are therefore to some extent supplementary. In each case the vice-county number and name is given, followed by the locality, date of collection and collector's name, of the earliest specimen known to the authors. The letter in brackets indicates the herbarium in which the specimen is located and the figure in brackets the number of records noted. The key to the herbaria is as follows:—

(A): University of Aberdeen.
(B): British Museum (Natural History).
(C): University of Cambridge.
(E): Royal Botanic Garden, Edinburgh.
(G): University of Glasgow.
(K): Royal Botanic Gardens, Kew.
(O): University of Oxford (including Herb. Druce).
(W): National Museum of Wales.
— : University of St Andrews. (No first records.)

The lists have been compiled from an examination of material in the above herbaria supplemented in recent years by our own observations. Sheets of our specimens have been sent to the British Museum.

NASTURTIUM OFFICINALE R.Br.

V-C

1, W. Cornw.; Phillack, 1839, *C. C. Babington*, (C), (6).
2, E. Cornw.; Downderry, 1887, *J. Vaughan*, (O), (3).
3, S. Devon; Salcombe, 1839, *S. Babington*, (C), (3).
5, S. Som.; Dunster, 1906, *A. H. Maude*, (B), (8).
6, N. Som.; Bedminster, 1882, *J. W. Painter*, (B), (2).
9, Dorset; Shapwick 1886, *R. P. Murray*, (B), (4).
10, Wight; Grange, Brixton, 1867, *F. Stratton*, (O), (3).
11, S. Hants.; Bishops Waltham, 1847, *S. Robinson*, (B), (2).
13, W. Sussex; Ferring, c. 1840, *Mrs H. Dixon*, (B), (2).
17, Surrey; Clapham Common, 1831, *S.A.N.*?, (B), (6).
18, S. Essex; Dagenham Docks, 1933, *R. S. Vine*, (K), (1).
19, N. Essex; Colnebrook, 1892, *J. W. Statter*, (B), (1).
20, Herts.; Welwyn, 1819, *W. Blake*, (O), (3).
21, Middlx.; Mill Hill, 1837, *Mr Children*, (B), (8).
23, Oxon.; Noke, 1871, *E. F. Linton*, (B), (10).
24, Bucks.; Wraysbury, 1881, *G. Nicholson*, (A), (4).
26, W. Suff.; Stoke-by-Nayland, 1941, *H. W. Howard*, (B), (1).
28, W. Norf.; Grimston to Pott Row, 1946, *E. L. Swann*, (K), (1).
29, Cambs.; Nine Wells, 1903, *A. Hosking*, (B), (O) & (C), (3).
30, Beds.; Hockliffe, 1944, *E. Milne-Redhead*, (K), (2).
32, Northants.; Thornhaugh, 1903, *H. H. Slater*, (W), (1).
33, E. Glos.; Siddington, 1944, *E. Milne-Redhead*, (K); Fairford, 1944, *F. Ballard & C. E. Hubbard*, (K), (4).
34, W. Glos.; Lydbrook, 1947, *C. C. Townsend*, (K), (1).
36, Heref.; Pontrilas, 1841, *G. Bentham*, (K), (6).
37, Worcs.; Tenbury, 1878, *J. Fraser*, (C), (2).
41, Glam.; Uplead & Ystrad, 1877, *A. Langley*, (W), (3).
42, Brecon; near Erwood, 1904, *S. H. Bickham*, (C), (2).
43, Radnor; Bottledock, Bach Howey, 1929, *A. E. Wade*, (W), (1).
44, Carm.; Kidwelly, 1930, *A. E. Wade*, (W), (1).
46, Card.; Penbryn, 1946, *E. Milne-Redhead*, (K), (2).
47, Montg.; Newton, 1939, *J. A. Webb*, (W), (1).
48, Mer.; Towyn, 1878, *H. E. Fox*, (O), (1).
49, Caern.; New Llandudno, 1867, *S. H. Bickham*, (C), (2).
53, S. Lincs.; near Rauceby station, 1945, *A. H. G. Alston*, (B), (1).
54, N. Lincs.; Kirkby-on-Bain, 1945, *A. H. G. Alston & N. D. Simpson*, (B), (1).
55, Leics.; Sibstone, 1884, *Bishop Mitchison*, (O), (1).
56, Notts.; Wollaton Park, 1877, *E. F. Linton*, (A) & (C), (2).
57, Derby; Cromford, Via Gellia, 1901, *E. Drabble*, (B), (1).
59, S. Lancs.; Ainsdale Beach, 1916, *F. A. Leeds*, (B), (1).
60, Mid Lancs.; Lancaster Marsh, 1782, (Herb. Drabble), (B), (1).
62, N.E. York; Scarborough, 1857, *Dr Harland*, (B), (1).
64, M.W. York; Bardsey near Leeds, 1902, *A. E. Bradley*, (B), (1).
66, Durham; Durham, 1870, *H. E. Fox*, (O), (1).
68, Chev.; Emleton, 1845, *W. Borrer*, (B), (1).
71, Man; Jurby, 1925, *C. I. Paton*, (B), (1).
73, Kirkc.; Kirkcudbright, 1883, *F. R. Coles*, (B), (1).
81, Berw.; "Berwickshire", 1865, *J. Anderson*, (B), (1).
82, Hadd.; Longniddrie, 1850, *J. T. Syme*, (B, K), (3).
85, Fife; Auchertool, 1848, [s.n.], (E), (3).
89, E. Perth; Blair Atholl, 1871, (Herb. R. Wight), (A), (1).
96, Easterness; Drumnadrochit, 1947, *Miss E. J. Gibbons*, (B), (1).

97, Westerness; Sundale & Swordale, Ardnamurchan, 1890, *S. M. Macvicar*, (B), (4).
102, S. Ebudes, Port Ellen, Islay, 1944, *G. P. Carson*, (B), (2).
103, Mid Ebudes; Tiree, 1947, *I. A. Williams*, (B), (1).
104, N. Ebudes; Canna, Allt Gheodrain, 1937, *Glasgow Univ. Canna Expedition*, (G), (1).
106, E. Ross; by Cromarty Firth, 1890, *C. Bailey*, (B), (1).
110, O. Hebr.; Barra, 1888, *A. Somerville*, (B), (6).
111, Orkney; Bu' Hoy, 1877, *H. H. Johnstone*, (E), (2).
112, Zetl.; Sandwick, 1921, *G. C. Druce*, (O), (1).
S., Sark; damp side of Creux Road, 1928, *F. Ballard & E. A. Golby*, (K), (2): Jersey; St Peter's Marsh, 1851, *J. Picquet*, (O), (2).
H.1, Kerry, S.; Ventry Harbour, 1938, *B. L. Burtt, S. Ross-Craig & J. R. Sealy*, (K), (1).
H.9, Clare; Roighan, Killenaboy Parish, 1947, *J. G. Dony*, (B), (1).
H.16, Galway, W.; Dog's Bay, Connemara, 1948, *R. D. Meikle*, (K), (1).
H.16 or 17, Galway, W. or N.E.; Galway, 1852, *A. Prior*, (K), (1).
H.33, Ferm.; Lurgan R., near Belcoo, 1948, *R. D. Meikle*, (K), (1).
H.39, Antrim; near Larne, 1945, *H. W. Howard*, (B), (3).

NASTURTIUM MICROPHYLLUM Boenn. ex Rchb.

V-C
3, S. Devon; Otterton, River Otter, 1881, *W. Fawcett*, (B), (1).
6, N. Som.; canal near Ashcott, 1892, *R. P. Murray*, (B); ditch near Shapwick, 1892, *E. F. Linton*, (B), (6).
9, Dorset; Wilke's Wood, 1883, *Mansel-Pleydell*, (B), (8).
10, Wight; near St Catherine's Point, 1932, *C. E. Hubbard & T. A. Sprague*, (K), (1).
11, S. Hants.; New Forest, 1889, *Capt. Stewart*, (W), (6).
13, W. Sussex; Selham, 1916, *C. C. Lacaita*, (B), (1).
14, E. Sussex; Isfield, 1867, *B. D. Jackson*, (A), (2).
15, E. Kent; Ham Ponds, 1888, *E. S. Marshall*, (C), (2).
16, W. Kent; Abbey Wood, Lownes Park, 1916, *C. Robinson*, (B), (1).
17, Surrey; Gatton Park Pond, 1857, *J. S. Mill*, (K), (16).
19, N. Essex; Great Bardfield, 1869, *H. E. Fox*, (O), (2).
20, Herts.; Hitchin, 1841, *J. Brown*, (E), (6).
21, Middlx.; R. Colne at Uxbridge, c. 1890, *J. Benbow*, (B), (1).
22, Berks.; Sunning Hill, 1773, (Herb. Banks), (B), (4).
23, Oxon.; Oxford, 1871, *E. F. Linton*, (B), (24).
24, Bucks.; Wycombe Regis, 1864, *E. Chandler*, (B), (2).
25, E. Suff.; Lowestoft, 1859, *H. Trimen*, (B), (1).
26, W. Suff.; Pakenham, 1830, *Mrs Casborne*, (C), (8).
27, E. Norf.; Horning, 1838, *T. R. Tuck*, (B), (5).
28, W. Norf.; Watton, 1911, *T. Robinson*, (B), (4).
29, Cambs.; Cambridge, 1840, Rothery Plants (ex *C. Darnell*), (C, E), (5).
30, Beds.; Hockliffe, 1944, *E. Milne-Redhead*, (K), (3).
31, Hunts.; Wyton, stream near Huntingdon Road, 1945, *H. W. Howard*, (B), (1).
32, Northants.; Thornhaugh, 1902, *H. H. Slater*, (W), (1).
33, E. Glos.; Barbers Bridge, Rudford, 1944, *H. K. Airy Shaw*, (K), (2).
34, W. Glos.; Frampton-on-Severn, 1909, *H. J. Riddelsdell*, (B), (1).
35, Mon.; Rumney, 1922, *A. E. Wade*, (W), (2).
37, Worcs.; Burford, Tenbury, 1878, *J. Fraser*, (B) & (W), (1).
38, Warw.; Lighthorne, 1852, *C. E. Palmer*, (O), (1).
39, Staffs.; Needwood Forest, 1837, *S. Babington*, (C), (1).
40, Salop; canal, Shrewsbury-Uffington, 1836, *W. A. Leighton*, (C), (3).
41, Glam.; Kenfig Pool, 1947, *E. Nelmes*, (K), (1).
42, Brecon; Llangorse Lake, 1925, *A. E. Wade*, (W), (2).
43, Radnor; Rhos-goch bog, 1881, *A. Ley*, (B), (1).
45, Pemb.; Tenby, 1860, (Herb. J. S. Gale), (O), (2).
49, Caern.; Llandudno, 1869, *S. H. Bickham*, (C), (2).

52, Angl.; Cors Bodeilio, 1930, *A. Wilson*, (W), (1).
54, N. Lincs.; Kirkby Lane, Woodhall Spa, 1931, *A. H. G. Alston*, (B), (3).
55, Leics.; Glenfield, 1913, *A. E. Wade*, (W), (2).
57, Derby; Great Longstone, 1944, *W. J. Garnett*, (B), (1).
58, Ches.; Bebington, 1924, *H. E. Green*, (W), (1).
59, S. Lancs.; Ince Blundell, 1901, *W. W. Mason*, (O), (2).
62, N.E. York; Buttercrambe, 1878, *G. Webster*, (A), (1).
63, S.W. York; Roche Abbey, 1883, *P. F. Lee*, (B), (1).
64, M.W. York; R. Nidd at Knaresborough, 1879, *M. Kirkly* ?, (C), (3).
67, S. Northumb.; Newton near Rothbury, 1948, *B. L. Burtt*, (K), (1).
69, Westm.; Peat Trenches, Ulverston, n.d., *E. Hodgson*, (B), (2).
82, Hadd.; Luffness Marshes, 1902, *E. Evans*, (E), (1).
83, Edinb.; Cramond, 1825, *W. Macgillivray*, (A), (6).
84, Linl.; Kirkliston, 1906, *W. E. Evans*, (E); stream near Winchborough, 1906, *R. F. Adamson*, (B), (2).
85, Fife; Balmuto, 1873, *J. B. Syme*, (B), (2).
89, E. Perth; near Blair Atholl, 1871, (Herb. R. Wight), (A), (1).
90, Forfar; Monifieth, 1870, [s.n.], (E), (2).
91, Kinc.; shore, Stonehaven to Netherley, 1901, *C. Bailey*, (O), (1).
92, S. Aberd.; Walkers Dam, Aberdeen, 1947, *A. G. Lyon*, (B), (5).
94, Banff; Boyne Bay, 1947, *Miss McCallum Webster*, (B), (1).
106, E. Ross; near Tain, 1891, *E. S. Marshall*, (C) & (B), (3).
110, O. Hebr.; S. Uist, 1888, *G. Somerville*, (B), (8).
S., Jersey; St Peter's Marsh, 1838, *C. C. Babington*, (C), (2).
H.6, Waterford; Dungarvan, 1880, *J. Britten*, (A), (3).
H.8, Limerick; Limerick, 1915, *J. E. Day*, (K), (1).
H.9, Clare; Carron near Corofin, 1947, *J. G. Dony*, (B), (1).
H.16 or 17, Galway, W. or N.E.; near Galway, c. 1923, *Mrs Evans*, (O), (1).
H.33, Ferm.; lough near Boho, 1947, *R. D. Meikle*, (K), (2).
H.37, Armagh; near Lough Neagh, Ellis's Cut, 1947, *R. D. Meikle*, (K), (1).

NASTURTIUM MICROPHYLLUM × OFFICINALE

1, W. Cornw.; between Maenporth & Tolypool, 1883, (Herb. H. Davies), (B), (1).
4, N. Devon; Marwood, 1892, *W. H. Painter*, (B) & (O), (1).
6, N. Som.; Bath, 1839, *S Babington*, (C), (2).
13, E. Sussex; near Loxwood, 1880, *W. H. Beeby*, (B), (2).
17, Surrey; Barnes Common, 1872, *J. H. Morgan*, (B), (5).
21, Middlx.; Staines, 1841, *J.F.G.* ?, (B), (4).
24, Bucks.; R. Chess, Chesham, 1945, *A. H. G. Alston*, (B), (1).
27, E. Norf.; Framingham, 1890, *R. S. Standen*, (B), (1).
28, W. Norf.; Watton, 1915, *F. Robinson*, (B), (3).
29, Cambs.; Sheeps Green, 1944, *H. W. Howard*, (B), (1).
30, Beds.; Barton, 1899, *D. M. Higgins*, (B), (1).
33, E. Glos.; below Seven Springs, 1916, *H. J. Riddelsdell*, (B), (1).
34, W. Glos.; Frampton-on-Severn, 1909, *H. J. Riddelsdell*, (B), (2).
39, Staffs.; Hoo Brook, Grindon, 1947, *H. K. Airy Shaw*, (K), (1).
41, Glam.; Fairwater, 1920, *A. E. Wade*, (W), (1).
48, Mer.; near Nannan, 1941, *J. A. Webb*, (W), (1).
49, Caern.; Bardsey, 1933, *P. M. Butler*, (B), (1).
52, Angl.; Llandona, 1943, *N. Y. Sandwith*, (B & K), (2).
54, N. Lincs.; Black Dyke, Waddingham, 1947, *J. Gibbons*, (K), (1).
57, Derby; Matlock, 1916, *A. J. Wilmott*, (B), (2).
58, Ches.; Disley, 1947, *H. W. Howard*, (B), (2).
60, Mid Lancs.; Blackburn, n.d., *C. A. Newdigate*, (B), (1).
62, N.E. York; Goathland, 1865, *M. Mennell*, (B), (2).
65, N.W. York; Cronkley Pastures, 1948, *A. J. Wilmott*, (B), (1).
66, Durham; below Dale House, Forest, Teesdale, 1948, *B. L. Burtt*, (K), (1).
68, Chev.; Bamburgh, 1909, *H. E. Fox*, (O), (1).
69, Westm.; Arnside, 1923, *W. C. Worsdell*, (K), (1).
77, Lanark; Possil Marsh, 1884, (Herb. R. M. Buchanan), (G), (1).

82, Hadd.; Tantallon Castle, 1932, *E. H. Stuart*, (E), (2).
83, Edinb.; Liberton, 1846, *W. B. Backie*, (B), (2).
85, Fife; Balmuto, 1875, *Boswell*, (B), (2).
86, Stirl.; Mugdock Loch, Strathblane, 1893, *R. Kidston*, (G), (1).
90, Forfar; Inverarity, 1944, *C. H. Cadman*, (B), (1).
96, Easterness; Allanfearn near Inverness, 1943, *U. Duncan*, (Herb. Brenan), (1).
97, Westerness; Glenmoidart Bridge, 1895, *S. Macvicar*, (B), (1).
109, Caithn.; Thurso River near Halkirk, 1881, *J. Grant*, (B), (1).
110, O. Hebr.; Pennylodden, Benbecula, 1947, *A. J. Wilmott*, (B), (1).
H.16, Galway, W.; Maam, 1895, *W. A. Shoolbred*, (B & W), (3).
H.20, Wicklow; banks of Dargle near Bray, 1872, *C. E. Palmer*, (O), (1).
H.29, Leitrim; near Manorhamilton, 1946, *S. Ross-Craig & J. R. Sealy*, (K), (1).
H.33, Ferm.; near Lough Melvin, 1948, *R. D. Meikle & E. N. Carrothers*, (K), (2).
H.37, Armagh; Newry, 1945, *H. W. Howard*, (B), (1).
H.39, Antrim; Ligoniel, near Belfast, 1945, *H. W. Howard*, (B), (5).

These lists must be regarded as being provisional only, and we would request the co-operation of other botanists in filling the gaps both from existing herbarium material which has not yet been determined, and also from new gatherings. Information, too, is required regarding the altitudinal limits of the species. Records for Watercress treated as a single species have been given by Wilson (1929) which indicate that, although mainly a lowland type, it may extend to above 1000 ft. The only recent and specific record has been communicated to one of us by Dr J. W. Gregor, who has collected specimens of *N. microphyllum* at 800 ft. in Midlothian. The only ecological preference so far found is in v.-c. H.39 (Antrim), where *N. officinale* occurs on the chalk near the coast and the hybrid on the basalt inland. Rather similar data for *N. officinale* and *N. microphyllum* have been given by Riddelsdell, Hedley & Price (1948).

We would like to take this opportunity of thanking those in charge of the herbaria listed above, for granting facilities for the examination of material in their respective charges.

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LAPSANA INTERMEDIA IN BRITAIN

By B. L. Burtt.

In July 1945 Mr E. Milne-Redhead found a conspicuously large-flowered colony of *Lapsana* on the chalky railway embankment at Totternhoe, Bedfordshire. He obtained both herbarium specimens and ripe fruits, from which plants were raised the following year in the Herbarium Experimental Ground at Kew. Few cases have demonstrated more clearly the value of this technique, for, whereas the wild-collected specimens might well have passed as a large-flowered form of *L. communis* L., the cultivated plants have proved to be robust perennials, and have developed leaf-differences which are scarcely discernible on the somewhat stunted wild specimens. From this living material a chromosome count was kindly made for us by Dr Janaki Ammal, and it was shown that the Totternhoe plant has a diploid chromosome number of 14, compared with the 12 of *L. communis*. Such distinctive characters suggested that the Totternhoe plant was not a variant of *L. communis* but a distinct, and presumably alien, species.

In western Europe the only native *Lapsana* is *L. communis*, which is widespread as a weed of roadsides, fields and waste places; in stubble it often occurs in a characteristically stunted, but very floriferous, form (see Morse and Palmer, 1925, *British Weeds*, tab. 6). In Britain this species favours the heavier types of land and is generally absent from the light, sandy, acid soils. Although it will stand a fair amount of shading at wood margins and under roadside trees, it is a plant whose habitats usually take it into full sunshine. Some seeds certainly germinate in the summer and the plants then overwinter in the rosette stage; but in the experimental ground, and probably in the wild also, seed germinating in spring flowers freely during the summer.

The centre of distribution of *Lapsana* lies in Asia Minor and the Caucasus and species found there extend into the Crimea and eastern Europe and into Syria and Palestine. In all this area we find a complex of ill-defined species which are, in the present state of our knowledge, exceedingly difficult of definition. To the taxonomist the task of identifying with fragmentary herbarium specimens a plant which has been available for detailed study in the garden is always perplexing, and the present case is no exception. To mention but a single illustrative point, it has been impossible to obtain reliable information about the duration of the oriental species of the genus. The Bedfordshire plant will bloom the first year from seed or it will germinate in the autumn and pass one winter before flowering. In either case it flowers and fruits freely in its first summer, but after the stems have died back lateral leaf rosettes are produced in autumn which carry it through

the winter and from the centre of which flowering stems arise in the following year. This is its normal rhythm and the original plants which germinated at Kew in spring 1946 are still alive (October 1949) and have flowered four times. This perennial habit is in marked contrast to the strictly annual growth of *L. communis*, but its present value as a taxonomic character almost disappears in the light of our ignorance of the life-span of the other species of the genus.

The most distinct of the oriental nippleworts is the Caucasian *L. erysimifolia* (Willd.) Thellung (syn. *L. grandiflora* M. Bieb.), which is the only species reported in the literature as being a perennial. In all other respects, however, the features by which it is distinguished from allied oriental species also serve to distinguish it from the Bedfordshire plant. These characters are: slightly larger flower-heads on longer peduncles, a less-branched stem, more angular-dentate leaves and involucral scales drying black. Individually none of these features is diagnostic, but in combination they do seem to warrant the current treatment of *L. erysimifolia* as a distinct species.

It is with the second Caucasian species, *L. intermedia* M. Bieb., that I have identified the Bedfordshire plant. This species is found in the Caucasus, Crimea (Tauria of old), Hungary (syn. *L. cancellata* Borbás), Thrace, and perhaps in northern Asia Minor. As I have not seen the type specimen it may be as well to quote in full Bieberstein's original description: —

Lapsana intermedia M. Bieb., 1819, *Fl. Taur-cauc.*, **3**, 540.

" L. caulescens ramosa, foliis angulato-dentatis; inferioribus lyrato-pinnatifolis, pedunculis calycibusque glabris, florum radio calyce longiore.

In Tauriae et Caucasi in umbratis, sylvosis vulgari alibi specie frequentior. Floret aestate.

Convenit cum *L. communi* glabritie paniculae et calycibus viridibus, sed discedit flore duplo fere majore, quâ notâ *L. grandiflorae* assimilatur. Hirsutie caulis atque foliorum sicut *L. communis* variàt."

It must be admitted at once that no specimens of *L. intermedia* have been seen which can be safely classed as perennials. On the other hand it is to be remembered that first year flowering specimens of the Bedfordshire plants do not look like perennials; in fact, the autumnal appearance of over-wintering rosettes came as a decided surprise when first observed at Kew. Nevertheless, this is a point on which confirmation is necessary before the determination *L. intermedia* can be accepted with complete confidence. If there were any immediate prospect of obtaining seed of true *L. intermedia*, the publication of this note would have been postponed. But the chances of doing so seem so remote under present circumstances that it has been thought better to put the British plant on record without further delay.

L. intermedia has been recorded as an occasional alien from Switzerland and elsewhere (see Thellung, 1911, *Vierteljahrsschr. Nat. Ges.*

Zürich, **56**, 290; and Hegi, 1928, *Ill. Fl. Mitt.-Eur.*, **6** (*2*), 1000) but the specimens have not been available for comparison.

It was at first thought that the Bedfordshire plant should be identified with *L. ramosissima* Boiss. (syn. *L. peduncularis* Boiss., *L. pisidica* Boiss. and *L. cassia* Boiss.), which is found in southern Asia Minor, Syria and Palestine. This view has now been abandoned because of the slighter habit and more glandular indumentum of *L. ramosissima*. There is also a biological point against such a determination, for it seems unlikely that a species with this distribution would be entirely hardy: the Bedfordshire plant, on the other hand, came through the very severe winter of 1946-1947 unscathed. It must be emphasised, however, that there are no clear-cut differences between *L. intermedia* and *L. ramosissima* and it might be better to treat them as a single very variable species. Such a unit would show no greater range of variation than, say, *Crepis capillaris* (L.) Wallr., to quote an example from an allied genus.

As already mentioned, starved first-year plants of the Bedfordshire *L. intermedia* are scarcely distinguishable from *L. communis* except by the larger flower heads. The floral characters for the two species are: —

	L. communis.	*L. intermedia.*
Diam. of capitulum	1.5-2 cm.	2.5-3 cm.
Length of involucre	6-8 mm.	8-9 mm.
Length of achene	2.5-4.75 mm.	2.5-4.5 mm.
No. of flowers in capitulum	15-20.	20-25.

It will be noticed that the larger size of the capitulum in *L. intermedia* is not reflected in a correspondingly larger fruit. The difference between the two species in the fruiting stage is most clearly expressed by the relative lengths of achene and involucre: in *L. communis* the achene is fully half the length of the involucre while in *L. intermedia* it is less than half as long.

The rather wide range of the length of achene in both species is due to the fact that the outer achenes in *Lapsana* are noticeably longer than the inner ones. The receptacle is flat, but is only about 1 mm. in diameter, whereas the diameter of the involucre at the level of the top of the achenes is 3 mm. The achenes form a flat-topped or slightly concave mass and consequently the outer ones are markedly longer than the inner. The outer ones are also distinctly curved whereas those from the centre of the head are straight.

In the experimental ground plants of *L. intermedia* have, in their second year, branched from near the base and have developed a decidedly bushy habit and produced an enormous number of flower heads. In the wild, however, Mr P. Taylor has observed that even the largest plants (up to 3 ft. high) are only branched in the upper part and are thus not dissimilar in habit from *L. communis*. It may be recorded

that the branching habit of *L. communis* is unchanged when grown free from competition in the experimental ground.

As to leaf-differences, the most noticeable is that the upper leaves of *L. intermedia* are almost entire, broadly linear and up to 1 cm. broad. The stem-leaves also differ and those of *L. intermedia* seldom show the almost rhomboid, sharply toothed outline which is characteristic of *L. vulgaris*.

I have not myself seen *L. intermedia* in its Bedfordshire locality, but a special visit there was made by Mr P. Taylor in August 1948, and he has given me the following information about its occurrence; it is particularly interesting that the larger plants were found to be obviously perennial in the wild, as they are in cultivation.

The habitat is a north-facing embankment on a branch railway, the slope of the bank being about 30°; the soil is almost pure chalk, apparently from a cutting further up the line. The closest house is about ½ mile away, in the proximity of which the nearest plants of *L. communis* are found. Openly spaced bushes of hawthorn are present on the bank, together with a rose, bramble and willow. The remaining vegetation is herbaceous and the *Lapsana* occurs in two or three patches over a distance of about 15 yards. Seedlings were present on more or less bare patches of soil and, as already mentioned, the older plants were certainly perennial.

The full list of associated species observed by Mr Taylor is as follows: —

Shrubs—*Rosa canina* L. var. *dumalis* (Bechst.) Dum. (one large straggling plant), *Rubus* sp., *Crataegus monogyna* Jacq., *Salix Caprea* L.

Dominant herbs—*Vicia Cracca* L., *Galium Mollugo* L. and *Arrhenatherum elatius* (L.) J. & C. Presl.

Other herbs—*Ranunculus acris* L., *Polygala vulgaris* L., *Arenaria serpyllifolia* L. and *Cerastium vulgatum* L. (on bare patches with *Lapsana* seedlings), *Silene Cucubalus* Wibel, *Trifolium campestre* Schreb., *Melilotus altissima* Thuill., *Vicia sativa* L. (*sensu lato*), *V. hirsuta* (L.) S. F. Gray, *Potentilla reptans* L., *Heracleum Sphondylium* L., *Pimpinella Saxifraga* L., *Galium verum* L., *Knautia arvensis* (L.) Coult., *Achillea Millefolium* L., *Centaurea nemoralis* Jord., *Chrysanthemum Leucanthemum* L., *Hieracium Lachenalii* Gmelin, *H. Pilosella* L., *Leontodon hispidus* L., *Picris hieracioides* L., *Tussilago Farfara* L., *Primula veris* L., *Clinopodium vulgare* L., *Holcus lanatus* L.

Mosses (covering considerable part of ground beneath *Rosa*)—*Brachythecium purum* Dixon, *Hylocomium splendens* B. & S., *Mnium undulatum* L.

Lichen—*Peltigera canina* Hoffm.

It should be noted that *L. intermedia* is, in its native area, a plant of thickets and shady places. It seems unlikely that it will ever rival *L. communis* as a weed, but it is hoped that any further records of its occurrence in this country will be quickly reported so that a careful check may be kept on any spread which may take place.

THE NOMENCLATURE OF THE BRITISH SPECIES OF GALINSOGA

By J. E. Lousley.

Two species of *Galinsoga* are thoroughly established in Britain. The first is the well-known *G. parviflora* Cav. which has been known since 1861 from the vicinity of Kew Gardens (Irvine in Baker, 1862) and has long been a common weed in gardens in the London area and elsewhere. The stems have a few short (c. ½ mm.) adpressed hairs which are denser towards the top, where there are usually a few glands. The leaves have blades seldom more than 4½-5 cm. long with shallow serrations. There are usually 3 external bracts to the flowers, the ligules are dirty white, small and inconspicuous and there are about 50 tubular flowers. The scales on the receptacle are trilobed; those on the achenes of the ligulate flowers are very small (under ½ mm.) and unlike the larger ones (over 1 mm.) of the tubular flowers, which are spathulate. Cavanilles' (1794) description and plate leave no doubt of the identity of the plant described by him.

The second species was first recorded for Britain in 1939 by Brenan (1939), who followed the accounts given by Thellung (1915) and Mosseray (1937) and therefore used the name *G. quadriradiata* Ruiz & Pavon var. *hispida* (DC.) Thell. It can be easily distinguished from *G. parviflora* by the greater size of the plants when growing under normal conditions. The stems are clothed with numerous whitish, spreading (and often somewhat deflexed) hairs about 1½ mm. long and are very glandular towards the top. The blades of the larger cauline leaves are usually 6½-7 cm. long, cuneate at the base, rhomboidal in outline, and with prominent rather acute serrations. There is said to be only 1 (rarely 2) external bract to the flower, the ligules are larger than in *G. parviflora*, a true, pure white and conspicuously trifid, and there are fewer (15-30) tubular flowers. The scales on the receptacle are entire; those on the achenes of the ligulate flowers are similar to those of the tubular flowers and aristate. The achenes are hispid.

The important characters distinguishing the fruits of the two species have been very clearly set out by Jovet (1934) in a table of which the following is a translation:—

	G. parviflora Cav.	"*G. aristulata*" (*G. quadriradiata* var. *hispida* of Brenan's paper)
Scales forming the corona of the achenes of the tubular flowers	spathulate, fimbriate, equalling or even exceeding the tube of the corolla.	aristate, terminating in very acute threads, equalling or almost equalling the tube of the corolla.

Corona of the achenes of the *ligulate* flowers	absent (often), or formed of linear simple, toothed, often few, short scales.	with very numerous scales which are fimbriate, aristate (similar to those of the discal flowers) and can equal the tube of the corolla.
Achenes	scarcely hairy, with hairs short, appressed or scarcely spreading.	hispid, with abundant long spreading hairs.

The nomenclature of the second species involves a number of very difficult problems. Ruiz & Pavon published *G. quadriradiata* in their *Systema Vegetabilium Flora Peruvianae et Chilensis* (1798). They attempted to contrast it with their *G. quinqueradiata* which is certainly *G. parviflora* Cav. which they cite under this. From this their description of *G. quadriradiata* differs only in " Corollis 4 radiatis " (instead of 5) and " Planta . . . sesquipedalis " (instead of bipedalis) and " foliis . . . rugosis " (not described in *quinqueradiata*). These differences have little significance and are insufficient to show that their plant was not a minor variant of *G. parviflora*. But they add, " Obs. 1 . . . Corollulae femineae profunde trifidae, purpurascentes." As is shown below, this reference to the colour of the ligules is important.

Much of Pavon's herbarium was purchased by A. B. Lambert and after the sale of his collections an important part (including manuscript lists of specimens supplied) went to the British Museum (Natural History). Other material eventually found a home at Oxford and Kew. Search has been made at all these herbaria but no specimen which could be regarded as a type of *G. quadriradiata* has been found. Thellung (1915) in a footnote states that he saw an " original example " in Herb. Boissier which showed " the characteristic hairs and glands, the *reddish* colour of the ligules and the very short (½ mm.) and blunt pappus-scales " (the italics are mine).

Bicknell (1916), in discussing two North American plants identical with ours, drew attention to the uncertainty about Ruiz & Pavon's second species and wrote, " In some respects the characterization of *G. quadriradiata* Ruiz & Pav. (*Syst. Veg.*, 198, 1798) might seem to refer to our plant but, as a whole, it is more descriptive of, and clearly applicable to, a mere form of *G. parviflora* Cav. (*G. quinqueradiata* Ruiz & Pav. *l.c.*), as was long ago determined by De Candolle." Bicknell therefore gave our second species a new name—*G. aristulata*.

St John & White (1920) revised the North American (and one Bolivian) species of *Galinsoga* using the colour of the ligules as the primary character for dividing the genus. At first sight this would appear less satisfactory than the use by Thellung (1915) of the shape of the pappus-scales but in practice it works out very much better. Thus Thellung amalgamated the purple rayed *G. hispida* Benth. (1844) (type in Herb. Kew) and *G. brachystephana* Hort. Berol. ex Regel, with *G. quadriradiata*. Examination of the type of the first suggests that it differs

in other characters than the ray colour, while the second is *G. caracasana* (DC.) Sch.-Bip., which St John & White (1920) say has achenes of the ray-florets glabrate or hispidulous on one side. Separation of herbarium material of South American Galinsogas into those with ray-flowers purple or roseate-purple and those with them yellowish or whitish as is done by St John and White for the North American plants indicates that the character of colour is here a good one.

It follows from Ruiz & Pavon's observation (see above) that their *G. quadriradiata* was neither *G. parviflora* nor the plant we have known under their name in this country.

S. F. Blake (1922) demonstrated that the genus *Adventina*, described from North American material by that eccentric botanist Rafinesque (1836) and overlooked by later workers, was in fact an account of two species of *Galinsoga*. Rafinesque's *Adventina parviflora* is clearly to be identified with *G. parviflora* Cav. The description of his second species can leave no doubt that his *A. ciliata* is Bicknell's *G. aristulata* and our *G. quadriradiata*. Rafinesque's account is graphic and draws attention to the production of abortive short terminal branches in the forks of the stem. I pointed out this feature when distributing well-grown plants from Claygate (Lousley, 1947) and it appears to be very constant. By adopting the earliest available trivial the name will therefore be *G. ciliata* (Raf.) Blake.*

There is well-founded reluctance to employ any name based on Rafinesque's work but in this case it is difficult to find any valid reason for setting it aside. The original description is adequate, the work in which it appeared has been made available to a wide public, and Blake's combination has been widely used in American literature.

The main synonymy of the British plants is as follows:—

354. GALINSOGA Ruiz & Pavon (1794).

1. *G. parviflora* Cav. (1794).
2. *G. ciliata* (Raf.) Blake (1922); *Adventina ciliata* Raf. (1836); *G. parviflora* Cav. var. *hispida* DC. (1836), non *G. hispida* Benth. (1844); *G. quadriradiata* var. (vel subsp.) *hispida* (DC.) Thell. (1915, 11); *G. aristulata* Bickn. (1916).
   f. *Vargasiana* (Thell.) comb. nov.; *G. quadriradiata* var. *quadriradiata* f. *Vargasiana* Thell. (1915, 14), Brenan (1939); *G. quadriradiata* var. *hispida* f. *Vargasiana* (Thell.) Brenan (1947).

The native country of both these Galinsogas is almost certainly in South America and is generally given as Peru but there is room for further research into this question. Both are weeds of cultivated land and spread rapidly. *G. parviflora* is now almost cosmopolitan. *G. ciliata* is less aggressive but has spread rapidly in several European countries in the present century. Both were known near New York as early as

*Blake's *comb. nov.* was actually printed as *Galinsoga cilata* but this is clearly an orthographic error.

1836. Some species of *Galinsoga* are undoubtedly native in remote mountain districts of the southern United States and in South America and it is likely that *G. parviflora* and *G. ciliata* had such a home. They probably found their way into cultivated fields before the discovery of America by Europeans. It is significant that the two references to *G. parviflora* in Pavon's diary give it as found in cultivated fields, and I have seen no specimens of either species marked from clearly native localities.

In conclusion I should like to express my gratitude to Messrs A. J. Wilmott, W. R. Philipson, and E. B. Bangerter of the British Museum (Natural History), N. Y. Sandwith and J. P. M. Brenan of the Royal Botanic Gardens, Kew, and Dr E. F. Warburg of Oxford, for help and advice in the preparation of this paper. A debt is also due to M. P. Jovet of the Muséum National d'Histoire Naturelle, Paris, who drew my attention to the problem in correspondence and whose publications have been of great assistance.

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SHORT NOTES

ALIENS IN FIELD AT FROYLE, N. HANTS, V.C.12

On October 12th, 1947, the gamekeeper reported to me that he had seen some strange weeds in a field at Yarnham's Farm, one of which I knew by his description to be *Datura Stramonium* L. I visited the field, which is of about six acres, with soil of clay with flints on upper chalk. The 600 ft. contour line crosses the field about the middle, the ground sloping to the south. The lower part was planted with potatoes and the top 1½ acres with ridge cucumbers, and it was in this piece that the aliens were growing. The manures used were:—Farmyard, Fisons potato manure, potassium chlorate, and castor meal.

In addition to the one *Datura* plant and fifty species of weeds common on arable ground, the following aliens were found. They have been identified at the British Museum (Natural History) and by Mr J. P. M. Brenan (the latter are marked *):—

Abundant—*Amaranthus chlorostachys* Willd.*, *A. Dinteri* Schinz var. *uncinatus* Thell.*, *Chenopodium carinatum* R. Br., *C. carinatum* × *cristatum* (F. Muell.) F. Muell. (det. Dr Aellen).

Occasional—*Erodium cygnorum* Nees*, *Medicago minima* (L.) Bartal. var. *recta* (Desf.) Burnat, *Xanthium spinosum* L., *Physalis ixocarpa* Brot., *Chenopodium pumilio* R. Br., *C. cristatum* (F. Muell.) F. Muell.

Rare—*Erysimum* sp.? (too young for identification), *Malvastrum spicatum* (L.) A. Gray, *Medicago laciniata* Mill. var. *brachyacantha* Boiss., *Nicandra physaloides* (L.) Gaertn., *Sorghum vulgare* Pers., *Eragrostis poaeoides* Beauv., *E. pilosa* (L.) Beauv.

Soon afterwards the ground was ploughed, and again during the spring of 1948. It was then harrowed and in July planted with Broccoli in rows 3 ft. apart. It received no more cultivation and soon became covered with weeds of which *Stellaria media* L. was dominant, covering most of the ground. Only about twenty species were found in 1948, and only three of the aliens, *Amaranthus chlorostachys* fairly abundant in one part of the field, and one plant each of *Erodium cygnorum* and *Medicago laciniata* var. *brachyacantha*.

C. LANGRIDGE.

THE HERBARIUM OF THE SOMERSET ARCHAEOLOGICAL AND NATURAL HISTORY SOCIETY

The Herbarium is housed in the Society's Museum at Taunton Castle, Taunton, Somerset. It contains about 3,500 specimens of phanerogams, mounted on sheets the same size as those of the British Museum Herbarium. The principal collection is that of Miss M. A.

Livett (-1933), which is mostly from Somerset. Another large collection is that of Dr H. Franklin Parsons (1846-1913), consisting mostly of Somerset and Wiltshire specimens. There is another Parsons Herbarium at Grangewood Museum, Croydon.† The British Herbarium of the Rev. C. S. Parish (1822?-9), who is best known for his Burmese collections, is also at Taunton. It is not confined to Somerset and includes specimens from Surrey, etc.* In addition there are specimens from H. S. Thompson (Somerset), H. Slater, G. C. Druce, Rev. S. F. Dymock, Spencer Bickham (Cheshire), J. Ray (Epping), H. J. Riddelsdell, A. Ley, M. Slater, R. P. Murray, F. J. Hanbury, T. R. Sim, E. S. Marshall, Dr Stephenson, Mary Sykes, C. Maplebeck, J. G. Baker, W. Salkeld (Cumberland), E. H. Sheppard (Killarney), J. Ball (Kerry), Henry Kingsley (Uxbridge), G. Maw (Devon), Dr Anthony Southby (Somerset and Cornwall), Thomas William Cowan (Somerset), Mrs Hutchinson (Salop), J. Cunnack (Cornwall), Corder (Essex), W. R. Crotch (Somerset), J. T. Syme, Charles Bailey, C. Rogers, F. Y. Brocas (Richmond, etc.), T. Barclay (Montgomery), R. C. Alexander (Wilts, Cornwall), W. S. Clarke, G. H. K. Thwaites, E. Parfitt. Probably these are mainly duplicates received through exchange clubs.

The cryptogamic herbarium includes a collection of marine algae made by Miss Isabel Gifford, C. S. Parish's British Mosses, and a set of R. Braithwaite's Sphagnaceae (1877).

Thomas Clark's (1793-1864) Herbarium is also here. He lived at Bridgwater and wrote (1856-7) "A Catalogue of the Rarer Plants of the Turf Moors of Somerset," *Proc. Somerset Arch. Soc.*, 7 (2), 64. His specimens were mostly collected in Somerset.

A. H. G. Alston.

†A note in the *Journal of Botany*, **52**, 280, 1914, states that the whole of Dr H. Franklin Parson's natural history collection (including his herbarium) would be accessible to the public at the Grangewood Museum, Croydon. At the present time Croydon Natural History Society possess three herbarium cabinets containing phanerogams, bryophytes, etc., from Surrey and elsewhere collected by Dr Parsons. These are stored at their headquarters at Eldon House, Croydon, and are commonly referred to (with other geological and botanical specimens) as the "Parsons Bequest." The collections agree with the description in the note cited above and it is highly probably that they are those intended for the small building in Grangewood Recreation Ground.—J. E. Lousley.

*I am indebted to Mr A. D. Hallam, who is in charge of the Herbarium, for some of the information in this note.

PLANT RECORDS

Compiled by E. C. Wallace.

Records are for the year 1948 when no date is given.
The following signs are used: —

§ before the *B.P.L.* number: to indicate that the paragraph contains information necessitating a correction in the annotated copy of the *Comital Flora*.

† before the *B.P.L.* number: to indicate that the plant is not a native species in the British Isles.

† before the record: to indicate a native species which is not native in the locality recorded.

* before the record: to indicate new vice-county records, not previously published.

‡ before the record: to indicate records additional to an annotated copy of *Comital Flora*, previously published elsewhere.

[ ] enclosing a record: to indicate doubt as to the validity of the record, either of identification or locality.

2/2(2). Thalictrum arenarium Butcher. 105, W. Ross; old dune, Big Sand, near Gairloch, H. Milne-Redhead, R. Mackechnie and E. C. Wallace.

5/1. Myosurus minimus L. 37, Worcs.; Eckington Bridge, Birlingham, near Pershore, Mrs A. Paton, comm. D. McClintock.

§9/2. Helleborus foetidus L. †*43, Rad.; Clyro, 1946, J. E. Beckerlegge, comm. Nat. Mus. Wales. *†58, Ches.; in a copse near Neston, Wirral, 1946, W. S. Lacey, (1947, *N.W. Nat.*, **22**, 116).

§14/1. Aconitum anglicum Stapf. *†69b, N. Lancs.; Old Park Wood, Holker, 1948, G. Wilson, comm. Carlisle Museum.

†21/15. Papaver atlanticum (Ball) Cosson. 17, Surrey; established on a lane bank, Godstone, D. McClintock.

23/1. Glaucium flavum Cr. 15, E. Kent; plentiful in an anti-tank ditch on the chalk downs behind Folkestone—up to two miles from the sea—F. Rose.

†27/1. Argemone mexicana L. 33, E. Glos.; (2a) waste, by-pass, Gloucester, C. C. Townsend.

32/1. Fumaria capreolata L. 15, E. Kent; Kingsdown Beach, 1946, F. Rose; Coxheath, 1947, M. Paffard and F. Rose.

32/9. Fumaria Bastardi Boreau. 41, Glam.; Port Eynon dunes, J. E. Lousley and D. McClintock.

32/5×10. Fumaria Boraei Jord. × officinalis L. 15, E. Kent; Coxheath, C. West.

37/1. Arabis hirsuta (L.) Scop. 30, Beds.; 6-7 plants on chalk escarpment grassland, Dunstable Downs, 1943, B. Verdcourt—antedates record in *B.E.C. 1945 Rep.*, 51 (1947), E.C.W.

†49/4. Sisymbrium orientale L. 69b, N. Lancs.; Ramsden Dock, Barrow-in-Furness, G. Wilson, comm. Carlisle Museum.

†49/13. Sisymbrium Loeselii L. 30, Beds.; rubbish dump, Sundon, J. G. Dony, det. A. J. Wilmott.

†52/3. Camelina sylvestris Wallr. 30, Beds.; railway embankment, Flitwick, E. T. Blundell, comm. J. G. Dony, det. A. J. Wilmott.

54/1. Brassica oleracea L. †85, Fife; cliffs at Elie, Mrs H. Stewart, comm. Carlisle Museum.

54/5. Brassicella monensis (Huds.) O. E. Schulz. 41, Glam.; two colonies on sandy cliffs of Three Cliffs Bay, Gower; recorded from here at intervals from 1838 but regarded by local botanists as probably extinct (see Vachell, 1936, *Glamorgan County History*, **1**, 1940). J. E. Lousley and D. McClintock.

†54/6. Brassicella Erucastrum (L.) O. E. Schulz. 41, Glam.; abundant on dunes, Jersey Marine, J. E. Lousley, D. McClintock and Miss E. Vachell.

54/22. Brassica incana (L.) F. Schultz (as Hirschfeldia incana (L.) Lagrèze-Fossat). †15, E. Kent; common from North Foreland to Sandwich and on dunes at Shellness; evidently spreading rapidly—probably from the sidings at Richborough, where it is well known, J. E. Lousley, R. Graham and D. McClintock. †41, Glam.; abundant on dunes, Jersey Marine, J. E. Lousley, D. McClintock and Miss E. Vachell. †44, Carmarthen; sidings by Pembrey Station and on Pembrey dunes, J. E. Lousley and D. McClintock.

55/1. Diplotaxis tenuifolia (L.) DC. †69b, N. Lancs.; Ramsden Dock, Barrow-in-Furness, 1948, G. Wilson, comm. Carlisle Museum.

†70/2. Vogelia paniculata (L.) Hornem. 16, W. Kent; rubbish dump near Sevenoaks, 1948, D. McClintock, det. and comm. J. E. Lousley.

†76/3c. Rapistrum rugosum (L.) All. var. venosum (Pers.) DC. 30, Beds.; railway siding, Blunham, H. B. Souster and J. G. Dony, det. A. J. Wilmott.

†85/4. Reseda Phyteuma L. 15, E. Kent; cornfield, chalk, Westwell near Ashford (also found 2 fields away in 1946), C. N. Pope, comm. J. E. Lousley.

88/19. Viola Lejeunei Jord. 107, E. Suth.; Badnellan, Brora, W. A. Tod, det. A. J. Wilmott.

†95/1. Saponaria officinalis L. 41, Glam.; abundantly naturalised on dunes, Jersey Marine, J. E. Lousley and D. McClintock.

96/2×1. Silene Cucubalus Wibel × maritima With. 6, N. Som.; about old mine workings near Rowberrow, Mendips, varying forms of the hybrid occur, C. I. and N. Y. Sandwith (1948, *Proc. Brist. Nat. Soc.*, **27**, 203).

96/5. Silene anglica L. 41, Glam.; Jersey Marine dunes, J. E. Lousley and D. McClintock.

†96/16. Silene dichotoma Ehrh. 17, Surrey; (7) cornfield between Banstead and Epsom Downs, 1943 or 1944, J. G. Maltby, det. J. E. Lousley, comm. D. P. Young.

†96/27(2). Silene coeli-rosa (L.) A.Br. 30, Beds.; rubbish dump, Sundon, J. G. Dony, det. N. Y. Sandwith.

98/1. Lychnis Flos-cuculi L. 105, W. Ross; wet gully on Ben Dearg, Torridon Forest, alt. c. 1500 ft., July 1947, R. Mackechnie.

§100/7. Cerastium pumilum Curt. *†30, Beds.; railway ballast, Sundon, 1944, J. G. Dony; along five miles of railway plentifully from Sharnbrook to Oakley, 1948, E. Milne-Redhead and J. G. Dony; railway, south of Bedford, 1948, J. G. Dony.

§100/8. Cerastium semidecandrum L. 69b, N. Lancs.; Roanhead, near Dalton-in-Furness, G. Wilson, comm. Carlisle Museum: *102, S. Ebudes: sandhills, Traigh nam Barc, Isle of Colonsay, C. W. Muirhead, comm. Carlisle Museum.

†100/12. Cerastium tomentosum L. 43, Rad.; walls, Presteigne, J A. Webb, comm. Nat. Mus. Wales.

101/6. Stellaria Dilleniana Moench. 15, E. Kent; Preston Court Marshes, F. Rose: between Stodmarsh and Grove Ferry, 1947, L. Wilson: reported near Preston to Miss E. M. Day about 15-20 years ago, comm. F. Rose.

102/6. Arenaria leptoclados Guss. 61, S.E. York; disused gravel pit near Shiptonthorpe, C. M. Rob.

§103/7. Sagina ciliata Fr. *44, Carm.; railway track, Burry Port, J. E. Lousley and D. McClintock.

§103/7(2). Sagina filicaulis Jord. ‡7, N. Wilts.; Lydiard Millicent, Mrs Shepherd, comm. J. D. Grose (1948, *Wilts. Arch. N.H. Mag.*, **52**, 226). 15, E. Kent; railway ballast, Shepherds Well, 1946, D. P. Young, det. A. J. Wilmott.

§111/2. Elatine hexandra (Lapierre) DC. ‡104, N. Ebudes; Loch Papadil, Rhum, J. Heslop Harrison (1947, *Vasc. Subst.*, *32*, 24).

†112/3. Hypericum hircinum L. 52, Angl.; roadside close to an estate near Beaumaris, 1947, N. Woodhead and R. D. Tweed (1947, *N.W. Nat.*, *22*, 117).

112/12. Hypericum dubium Leers. 42, Brecon.; below Don-y-graig, Cefn Coed, J. E. Lousley, D. McClintock and Miss E. Vachell.

123/3. Tilia cordata Mill. 38, Warw.; several trees in good flower in Oversley Wood, Alcester, F. Rose.

§125/2. Linum anglicum Mill. 55, Rutland; wrongly deleted from v.-c. 55 in *B.E.C. 1945 Rep.*, 45—the erroneous records only concerned Leics. (see Horwood & Noel, 1933, *Fl. Leics. and Rutl.*, 675)—F. Rose.

†127/24b. Geranium ibericum Cav. var. platypetalum (F. & M.) Boiss. 33, E. Glos.; (7b) gravel pit, Shurdington, 1947, C. C. Townsend, det. A. J. Wilmott.

†128/14. Erodium cygnorum Nees. 30, Beds.; a wool alien, railway siding, Flitwick, 1948, J. G. Dony, det. N. Y. Sandwith.

§†133/2. Impatiens capensis Meerburgh. *55, Leics.; canal, Debdale Wharf, near Foxton, F. A. Sowter.

†133/3. Impatiens parviflora DC. 70, Cumb.; roadside opposite Skinburness Hotel, Silloth, Miss N. M. Stalker, comm. Carlisle Museum.

†133/4. Impatiens glandulifera Royle. 16, W. Kent; abundant by the silted-up lakes, Glassenbury Park, Goudhurst, F. Rose.

†140/2. Vitis hederacea Ehrh. 17, Surrey; (8) Selsdon Road, Croydon, climbing over elder bushes (see note under *Salvia verticillata* regarding site), first noted 1939, destroyed by building, 1948; although growth was vigorous it never flowered, D. P. Young. 41, Glam.; Gower, established on sand-dunes, Oxwich, J. E. Lousley and D. McClintock (as *Parthenocissus quinquefolia* (L.) Planch.).

†153/6. MEDICAGO MINIMA (L.) Bartal. 30, Beds.; a wool alien, railway siding, Flitwick; previous records refer to var. *recta* (Desf.) Burnat, J. G. DONY.

†153/16. MEDICAGO TRIBULOIDES Desr. 30, Beds.; a wool alien, railway siding, Flitwick, N. Y. SANDWITH, B. VERDCOURT and J. G. DONY.

†155/15(2). TRIFOLIUM ELEGANS Savi. 30, Beds.; gravel pit, Eaton Socon, J. G. DONY and J. E. LOUSLEY.

†155/38. TRIFOLIUM TOMENTOSUM L. 30, Beds.; a wool alien, railway siding, Flitwick, J. G. DONY.

166/1. ASTRAGALUS GLYCYPHYLLOS L. 54, N. Lincs.; hedgebank in Haxey, in the Isle of Axholme (apparently on Keuper Marl), F. ROSE.

§176/4. VICIA OROBUS DC. *105, W. Ross; low hillocks by the sea, Mellon Charles, R. MACKECHNIE, H. MILNE-REDHEAD and E. C. WALLACE.

†176/5. VICIA VILLOSA Roth. 27, E. Norf.; gravel pit, Frettenham, J. E. LOUSLEY and D. MCCLINTOCK.

†176/6. VICIA DASYCARPA Tenore. 27, E. Norf.; by gravel pit, Frettenham, J. E. LOUSLEY and D. MCCLINTOCK.

§176/9. VICIA LUTEA L. *69b, N. Lancs.; Roanhead, near Dalton-in-Furness, 1948, G. WILSON, comm. CARLISLE MUSEUM.

176/14. VICIA LATHYROIDES L. 16, W. Kent; Shorne Warren, D. MCCLINTOCK, det. J. E. LOUSLEY.

†176/26. VICIA PANNONICA Crantz. 17, Surrey; many plants in a field of vetches and peas near Trumps Green, Virginia Water; the typical form, var. *typica* Beck., with creamy-white corollas, the standard with brownish-olive stripes on the inner surface, N. Y. SANDWITH.

†176/37. VICIA ERVILIA (L.) Willd. 23, Oxon.; several plants in a cornfield on chalk, near Goring, Mrs F. PARTRIDGE and N. Y. SANDWITH.

†178/3. LATHYRUS TUBEROSUS L. 85, Fife; near Elie, in waste ground by field, 1948, Miss E. C. SHARP and Miss U. K. DUNCAN, comm. U. K. DUNCAN.

185. RUBUS. All specimens determined by W. C. R. WATSON except where otherwise stated.

185/6. RUBUS PLICATUS W. & N. 70, Cumb.; railway bank on disused Bromfield to Abbey Town line, C. W. MUIRHEAD, comm. CARLISLE MUSEUM.

185/9(2). Rubus Briggsianus (Rogers) W. Wats. *35, Mon.; The Minnetts, St Brides, 1904, W. A. Shoolbred (as *R. affinis* W. & N.), comm. Nat. Mus. Wales.

185/17. Rubus incurvatus Bab. 70, Cumb.; Grune Point, Skinburness, C. W. Muirhead, comm. Carlisle Museum.

185/29. Rubus polyanthemos Lindeb. 70, Cumb.; bank near Cargo-on-Eden; hedge near Buttermere village; Skinburness, Silloth; C. W. Muirhead, comm. Carlisle Museum.

†185/38. Rubus laciniatus Willd. 107, E. Suth.; roadside between Brora and Gordonbush, one mile from nearest house, W. A. Tod, det. A. J. Wilmott.

185/41(2). Rubus sciocharis (Sudre) W. Wats. *35, Mon.; near Llanvair Discoed, 1910, and Hale Wood, Tintern, 1892, W. A. Shoolbred: Chepstow Park, 1925, H. J. Riddelsdell, comm. Nat. Mus. Wales.

185/42. Rubus leucandrus Focke. *35, Mon.; marshy thicket below Coed Cae, Shirenewton, 1897, W. A. Shoolbred (as *R. Selmeri* Lindb.); previous records from Mon. were based upon misidentifications, comm. Nat. Mus. Wales.

185/61. Rubus bracteosus Weihe. 35, Mon.; Trelleck Bog, 1891, W. H. Purchas (as *R. nitidus* W. & N.), comm. Nat. Mus. Wales.

185/73. Rubus egregius Focke. 70, Cumb.; Blaithwaite, near Wigton, 1946, J. Parkin, comm. Carlisle Museum.

185/80. Rubus mucronifer Sudre. 70, Cumb.; Winding Bank, Abbey Town, C. W. Muirhead, comm. Carlisle Museum.

185/83. Rubus alterniflorus M. & L. *35, Mon.; near Tintern, 1891, W. A. Shoolbred (as *R. nemoralis* P.J.M., forma); The Forest, Llangibby, 1943, A. E. Wade, comm. Nat. Mus. Wales.

185/109(2). Rubus diversus W. Wats. 70, Cumb.; by the R. Eden, Wetheral, C. W. Muirhead, comm. Carlisle Museum.

185/120(2). Rubus foliosus Weihe. *35, Mon.; Darren Road, Risea, 1942, A. E. Wade, comm. Nat. Mus. Wales.

185/129(2). Rubus adenolobus W. Wats. 70, Cumb.; roadside near Cargo-on-Eden, C. W. Muirhead, comm. Carlisle Museum.

186/1. Dryas octopetala L. 96, Easterness; in some quantity on rock ledges of Coire Chuirn, south of Dalwhinnie, c. 2200-2400 ft., N. Y. Sandwith and C. L. Hare.

190/4. ALCHEMILLA VESTITA (Bus.) Raunk. 107, E. Suth.; Doll, Brora, W. A. TOD, det. A. J. WILMOTT.

§199/1. SAXIFRAGA AIZOIDES L. ‡110, O. Hebr.; Isle of Barra, J. Heslop Harrison (1947, *Vasc. Subst.*, **32**, 16).

199/21. SAXIFRAGA NIVALIS L. 89, E. Perth; Forest of Atholl, sparingly on rocks of deep gorge of Allt Mhic an Righ, near Sronphadruig Lodge, c. 2200 ft., N. Y. SANDWITH.

†211/1(2). SEDUM SPURIUM M.B. 43, Rad.; walls, Presteigne, J. A. WEBB, comm. NAT. MUS. WALES.

216/2. MYRIOPHYLLUM ALTERNIFLORUM DC. 62, N.E. York; Gormire tarn, at a depth of 18-19 ft., W. G. Burton (1948, *Naturalist*, *43-44*).

216/3. MYRIOPHYLLUM VERTICILLATUM L. 7, N. Wilts.; canal, Bradford-on-Avon, O. Buckle, comm. J. D. Grose (1948, *Wilts. Arch. N.H. Mag.*, **52**, 226).

†220/17. EPILOBIUM PEDUNCULARE A. Cunn. 48, Mer.; Craig-y-Benglog, near Dolgelley, 1947, DEPT. OF BOTANY, UNIV. COLL. ABERYSTWYTH, comm. NAT. MUS. WALES. 49, Caern.; in abundance, Cwm-y-Foel, Moel Siabod, 1947, EVAN ROBERTS, comm. NAT. MUS. WALES: floor of the quarry on Penmaen Mawr, alt. c. 1500 ft., 1947, W. S. Lacey (1947, *N.W. Nat.*, *22*, 116-117).

†224/1. FUCHSIA RICCARTONI Hort. 45, Pemb.; naturalised on the cliff face near the hotel, Goodrich, 1947, J. A. WEBB, comm. NAT. MUS. WALES.

†240/1b. ASTRANTIA MAJOR L. var. INVOLUCRATA Koch. 88, M. Perth; rocky and shady riverbank, Killin, N. Y. SANDWITH.

247/1. APIUM GRAVEOLENS L. 21, Middlx.; River-wall, London Dock, probably native, J. E. LOUSLEY.

§250/2. CARUM VERTICILLATUM (L.) Koch. *105, W. Ross; marsh by Loch Shiel, Glenshiel, E. F. & P. P. C. WARBURG.

†279/1. CORIANDRUM SATIVUM L. 17, Surrey; old brickfield, Earlswood, Miss B. M. C. MORGAN, comm. J. E. LOUSLEY. 21, Middlx.; in quantity on brick rubble by St Dunstans-in-the-East, City of London, J. E. LOUSLEY.

†292/1. LEYCESTERIA FORMOSA Wallich. 45, Pemb.; Parrog, 1947, J. A. WEBB, comm. NAT. MUS. WALES.

296/5. Galium pumilum Murr. 15, E. Kent; on chalk turf on the cliffs east of Dover—the form of this species in this and its other Kentish station (Chilham) is tall and slender, with a habit more like that of *G. erectum* Huds. than of the *G. pumilum* of the Mendips or the northern Carboniferous Limestone—F. Rose.

296/13. Galium anglicum Huds. 27, E. Norf.; in plenty on sandy railway bank, Mileplain Plantation, near Attlebridge, J. E. Lousley and D. McClintock.

298/1. Asperula odorata L. 29, Cambridge; plentiful under beeches in one spot on the earthwork, Gog Magog Park, R. A. Boniface and F. Rose.

†299/3. Phuopsis stylosa (Trin.) Benth. & Hook. f. ex Jacks. (Crucianella stylosa Trin.) 41, Glam.; abundant on a limestone bank, St Donats, J. A. Webb, comm. Nat. Mus. Wales.

§301/1. Valeriana officinalis L. *16, W. Kent; on chalky banks . . . (at) Cudham, 1906, W. H. Griffin (1909, *Woolwich Surveys*); on chalk hedgebank south of Green Street Green, near Farnborough; wood on chalk, west of Snodland, 1944-48, F. Rose. *19, N. Essex; Howe Wood, Strethall, on dry chalky Boulder Clay, R. A. Boniface and F. Rose.

304/1. Valerianella olitoria Poll. 29, Cambs.; a weed in the kitchen garden, Gog Magog Park, R. A. Boniface and F. Rose.

*†318/2. Aster paniculatus Lam. 33, E. Glos.; (2a) roadside ditch, between Ashchurch and Tewkesbury, naturalised, 1948, C. W. Bannister, det. A. J. Wilmott.

†318/3. Aster longifolius Lam. 107, E. Suth.; well established on bank of River Brora, W. A. Tod, det. A. J. Wilmott.

†318/6. Aster lanceolatus Willd. 69, Westm.; Esthwaite N. Fen, amongst *Molinia*; Waterhead, Windermere, with *Juncus filiformis, Achillea Ptarmica*, etc., T. G. Tutin.

§318/20. Aster Linosyris (L.) Bernh. *41, Glam.; Gower Peninsula. In small quantity but undoubtedly native on Carboniferous Limestone cliffs, 1948; associated with many of the species with which it grows in other localities on Carboniferous Limestone in Somerset, Caernarvonshire and Lake Lancashire; from its distribution the occurrence of the species in Glamorgan was to be expected; old records from other parts of that county on other geological formations are regarded as introductions or errors,—remove brackets in *C.F.*—J. E. Lousley, D. McClintock and Miss E. Vachell.

320/2. Erigeron acer L. 69b, N. Lancs.; Roanhead, near Dalton-in-Furness, G. Wilson, comm. Carlisle Museum.

†320/10b. ERIGERON KARVINSKIANUS DC. var. MUCRONATUS (DC.) Asch. 41, Glam.; Lisvane reservoir, near Cardiff, J. E. BECKERLEGGE, comm. NAT. MUS. WALES.

§†327/1. ANAPHALIS MARGARITACEA (L.) C. B. Clarke. *43, Rad.; one patch for many years on a hillside, Upper Goytre Farm, Beguildy, 1947, A. T. HUNT, comm. NAT. MUS. WALES.

†333/1. INULA HELENIUM L. 90, Angus; Parkhill near Arbroath, in waste ground by farm buildings, Miss U. K. DUNCAN.

†339/3. AMBROSIA ARTEMISIIFOLIA L. 24, Bucks.; edge of cornfield, Doney Bottom near Beaconsfield, Miss A. F. WOOD, det. and comm. J. E. LOUSLEY.

†353/6. BIDENS FRONDOSA L. 30, Beds.; a wool alien, railway siding, Flitwick, J. G. DONY, det. N. Y. SANDWITH.

§†371/3. MATRICARIA SUAVEOLENS (Pursh.) Buch. *102, S. Ebudes; Machrins, Isle of Colonsay, 1948, J. CREED and R. A. BOYD; comm. CARLISLE MUSEUM. *105, W. Ross; Torridon and Inver Alligin, 1947; Dundonnell and Gruinard, 1948, E. C. WALLACE.

†372/3. COTULA CORONOPIFOLIA L. 58, Ches.; with reference to the note in *Watsonia*, **1**, 46, 1949, I am informed by Dr A. J. Farmer that as representative of the Associated Learned Societies of Liverpool and District he met a representative of Wallasey Engineer's Staff on Leasowe Common on 30 May 1946 who satisfied him that the boundaries of the 12 acres over which tipping was proposed did not include the area where the plant grows best; if the proposed limits are adhered to the continued existence of the species should not be materially threatened in this locality, J. E. LOUSLEY: recorded from the Mersey shore near Bromborough Dock by M. Henderson and N. F. McMillan (1947, *N.W. Nat.*, *22*, 114); A. A. Dallman states that this station is an extension of its range and discusses its introduction.

382/7×8. ×SENECIO LONDINENSIS Lousley. 25, E. Suff.; with parents, Felixstowe Docks, J. E. LOUSLEY and D. MCCLINTOCK. 63, S.W. York; embankment of L.M.S. Railway between Woodhouse Mill and Beighton, 1947, J. BROWN, confirmed and comm. J. E. LOUSLEY.

§†383/7. SENECIO SQUALIDUS L. 22, Berks.; two specimens on Buckleberry Common, miles from any railroad, 1946, C. C. TOWNSEND. *69b, N. Lancs.; Ramsden Dock, Barrow-in-Furness, G. WILSON, comm. CARLISLE MUSEUM.

†389/2. ECHINOPS RITRO L. 22, Berks.; near top of Compton Hill, 1946, C. C. TOWNSEND.

396/3a. Cirsium helenioides (L.) Hill var. legitimum (Gaud.) Sledge. 57, Derby; Grin Plantation, Buxton, 1946, J. E. Lousley, R. H. and F. T. Hall, E. C. Wallace and Miss Ruth Carey, det. W. A. Sledge, comm. J. E. Lousley.

§422/3. Leontodon Leysseri (Wallr.) Beck. *102, S. Ebudes: Leaba Mhor, Oronsay, J. Creed and R. A. Boyd, comm. Carlisle Museum.

425/2. Lactuca Serriola L. †33, E. Glos.; (2a) arable field, Pamington, plentiful in 1946-8; Northway, spreading in 1948; these plants belong to a form with horizontal, undivided leaves, resembling *L. virosa* L., but the ripe fruits are always grey; this form has become increasingly common during recent years, C. W. Bannister, det. at Kew.

†425/9. Lactuca tatarica C. A. Mey. 50, Denb.; near the G.W.R. main line, Marford Hill, 1946, E. G. Williams, comm. Nat. Mus. Wales.

§433/1. Wahlenbergia hederacea (L.) Rchb. *15, E. Kent; heathy woodland ride on loam, north of Sissinghurst (with *Radiola*, *Centunculus* and *Centaurium pulchellum*), F. Rose.

†435/7. Campanula Rapunculus L. 15, E. Kent; (1) roadside at Evington, Elmsted (near Wye), 1947, P. R. Bell and F. Rose.

439/1. Oxycoccus quadripetalus Gilib. 38, Warw.; in a bog at Bickenhill Plantation, F. R. Rose.

439/1c. Oxycoccus quadripetalus Gilib. var. pyriformis Druce. 69, Westm.; abundant with the type, in bog at head of Lily Mere (west of Sedbergh), R. A. Boniface, J. Lavender and F. Rose.

444/1. Andromeda polifolia L. 69, Westm.; abundant in bog at head of Lily Mere (west of Sedbergh), R. A. Boniface, J. Lavender and F. Rose.

§441/2. Arctostaphylos alpina (L.) Spreng. 96, Easterness; summit ridge between Mam Sodhail and Sgurr na Lapaich at about 3100 ft. —higher than given in *C.F.*—1947, S. M. Walters and E. F. Warburg.

†451/2. Ledum latifolium Jacq. 70, Cumb.; Scaleby Moss, near Carlisle, known there for 30 years, H. Rummick, comm. Carlisle Museum.

453/1b. Pyrola rotundifolia L. var. maritima (Kenyon). 69b, N. Lancs.; Roanhead, near Dalton-in-Furness, 1948, G. Wilson, comm. Carlisle Museum.

468/1. CENTUNCULUS MINIMUS L. 46, Card.; abundant in dune slack, Ynys-las—recorded from here by Lees in 1842, but apparently not seen since (Salter, *Fl. Cardigansh.*)—P. W. RICHARDS. 105, W. Ross; coast at Mellon Charles, near Aultbea, E. C. WALLACE.

†473/1. VINCA MAJOR L. 46, Card.; hedgerow, Aberarth, J. A. WEBB, comm. NAT. MUS. WALES.

†474/2. BUDDLEIA DAVIDII Franchet. 45, Pemb.; Goodrich, 1947, J. A. WEBB, comm. NAT. MUS. WALES.

480/9b. GENTIANA CAMPESTRIS L. var. BALTICA (Murb.). 48, Mer.; moist hollows, calcareous sand dunes, Harlech, 1946, MARTIN P. M. RICHARDS, det. E. F. WARBURG (as *G. baltica* Murb.).

†493/2. LAPPULA ECHINATA Gilib. 17, Surrey; disused brickfield, Earlswood, Miss B. M. C. MORGAN, det. and comm. J. E. LOUSLEY.

†497/9. SYMPHYTUM GRANDIFLORUM DC. 17, Surrey; naturalised in a sunken lane, Bletchingley, Miss M. BRYAN, det. and comm. B. VERDCOURT.

†511/2. CALYSTEGIA SYLVESTRIS (Willd.) R. & S. 29 Cambs.; hedge of Botanic Garden Allotments, 1946, T. G. TUTIN. 69, Westm.; hedges near gardens, Coniston and Sawrey, 1947, T. G. TUTIN; roadside near Cartmel, A. P. CONOLLY. 88, M. Perth; hedge by garden near Loch Tummel, 1947, T. G. TUTIN.

†515/7. CUSCUTA SUAVEOLENS Sér. 35, Mon.; on *Antirrhinum majus*, Glansychan Park, Abersychan, 1947, J. W. BARKER, comm. NAT. MUS. WALES.

§521/1. ATROPA BELLADONNA L. ‡19, N. Essex; chalky hedgebank between Littlebury and Strethall, R. A. BONIFACE and F. ROSE—see Gibson, 1862, *Fl. Essex* and *B.E.C. 1932 Rep.*, 106, for earlier records.

532/3. LINARIA REPENS (L.) Mill. 17, Surrey; (8) Park Downs, Banstead, 1948, a small patch on chalk scrubland, shown me by Mr J. G. MALTBY; I cannot trace any previous record of this station, and although not far from houses there seems no reason to doubt its nativity here, D. P. YOUNG. 22, Berks.; an albino form, near Blewbury, 1946, C. C. TOWNSEND. 41, Glam.; abundant about railway lines, Jersey Marine: 44, Carm.; abundant on railway tracks, Pembrey and Burry Port, J. E. LOUSLEY and D. MCCLINTOCK.

†532/5. LINARIA SUPINA (L.) Desf. 44, Carm.; railway track near Burry Port Railway Station, J. E. LOUSLEY and D. MCCLINTOCK.

§543/9. VERONICA AQUATICA Bernh. ‡103, M. Ebudes; Isle of Coll, J. Heslop Harrison (1947, *Vasc. Subst.*, **32**, 16).

543/12. Veronica humifusa Dicks. 105, W. Ross; sparingly in Coire Mhic Fhearchair, Beinn Eighe, 1947, R. Mackechnie and E. C. Wallace.

†543/22. Veronica longifolia L. 41, Glam.; railway bank, Canton, Cardiff, Ruth Davies, comm. Nat. Mus. Wales.

†543/41. Veronica filiformis Sm. 13, W. Sussex; abundant by the Arun near Houghton, towards Arundel Park, E. C. Wallace. 33, E. Glos.; (2a) Cheltenham, T. A. Sprague: (7a) near Queen's Wood, Prestbury, C. C. Townsend, det. A. J. Wilmott: (7b) sandpits, Sandy Lane, Leckhampton, 1947, C. C. Townsend. 69, Westm.; High Wray, roadside in village, 1941—had increased somewhat by 1948, T. G. Tutin. 90, Forfar; hedgebank near Ardgarth, Lundie, 1947, E. F. Warburg.

545/2. Euphrasia borealis Wettst. 35, Mon.; meadow, roadside between Llanthony and Capel-y-ffin, Vale of Ewyas, 1944, R. Lewis, det. E. F. Warburg.

545/5c. Euphrasia nemorosa (Pers.) Löhr var. calcarea Pugsl. 28, W. Norf.; rail embankment on chalk, Narborough, 1945, E. L. Swann, det. E. F. Warburg.

§546/4. Bartsia viscosa L. †*34, W. Glos.; many plants over a wide area on Durdham Downs, Bristol, on ground which had been resown after occupation by the military, Mrs C. I. Sandwith.

548/3. Rhinanthus minor Ehrh. 33, E. Glos.; (2a) common in osier bed, Swindon Village, 1948, C. C. Townsend, det. A. J. Wilmott as what has been called ssp. *elatior* (Schur.) Soó forma *genevensis* Chabert.

§549/1. Melampyrum cristatum L. ‡55, Rutland; several records are given for Rutland in Horwood (1933, *Fl. Leics. and Rutland*) (overlooked in *B.E.C. 1945 Rep.*, 46), F. A. Sowter and F. Rose.

§550/7. Orobanche Hederae Duby. *5, S. Som.; Hurlston Point and Wootton Courtenay, 1942, J. E. Lousley: plentiful on the bushy cliffs west of Minehead, F. Rose.

§552/2. Utricularia neglecta Lehm. 89, E. Perth; Ben Vrackie, flowering, 1947, not given for Scotland by P. M. Hall in *B.E.C. 1938 Rep.*, 104-105 (1939), E. F. Warburg.

558/6a. Mentha piperita L. var. officinalis Sole. 36, Hereford; Rowlstone, and Eastnor near Brousie, F. M. Day, det. R. Graham.

558/13j. Mentha arvensis L. var. densifoliata Briq. 33, E. Glos.; (7a) on lower wood path, Puckham Wood, C. C. Townsend, det. R. Graham.

§558/14. Mentha Pulegium L. *35, Mon.; Roggiett, 1942, Mrs Ellis, comm. Nat. Mus. Wales.

†566/15. Salvia Horminum L. 19, N. Essex; Corporation Dump, Hythe near Colchester, J. E. Lousley, R. Graham and D. McClintock.

†566/17. Salvia verticillata L. 17, Surrey; (8) Selsdon Road, Croydon, first seen 1933, disappeared about 1941; the site, now built over, was a farmhouse garden many years ago, and other relics of cultivation that persisted nearby were *Vitis hederacea* Ehrh., *Smyrnium Olusatrum* L. (still extant), and *Ribes Grossularia* L.—D. P. Young. 50, Denb.; Marford gravel pits, The Rossett, 1948, E. G. Williams, comm. Nat. Mus. Wales.

§574/1. Melittis Melissophyllum L. *44, Carm.; shady bank bordering Gelligatti Woods, 1 mile west of Newcastle Emlyn, 1947, D. James; roadside below Bryn Blair, 1948, Isabel Murray; comm. Nat. Mus. Wales.

§578/1. Galeopsis speciosa Mill. *44, Carm.; Llanegwad, J. Brunker, comm. Nat. Mus. Wales.

587/2. Ajuga pyramidalis L. 102, S. Ebudes; Carnan Eoin, on Kiloran flags; Beinn nan Caorach, on mudstones, Isle of Colonsay, C. W. Muirhead, comm. Carlisle Museum.

§593/1. Herniaria glabra L. †*54, N. Lincs.; Grimsby Docks, 1929, S. A. Cox, det. and comm. J. E. Lousley.

600/6. Chenopodium murale L. †33, E. Glos.; (2a) Flour Mills, Tewkesbury, C. W. Bannister, det. at Kew. 41, Glam.; Port Eynon dunes, J. E. Lousley and D. McClintock.

†600/8k. Chenopodium album L. var. viride (L.) Syme. 30, Beds.; Tilsworth, 1947, J. G. Dony, det. J. P. M. Brenan (as *C. viride* L.).

†600/26(2). Chenopodium pumilio B.Br. 30, Beds.; railway siding, Flitwick, J. P. M. Brenan and J. G. Dony.

†600/34(4). Chenopodium Probstii Aellen. 30, Beds.; a wool alien. railway siding, Flitwick, J. G. Dony, det. J. P. M. Brenan.

615/4b. Polygonum viviparum L. var. alpinum Wahl. 49, Caern.; Cwm Glas, 1947, and near Clogwyn y Garnedd, Evan Roberts, comm. Nat. Mus. Wales.

†615/33. Polygonum sachalinense Schmidt. 97, Westerness; a large mass among grass near road west of Fort William, 1947, E. F. Warburg, det. T. G. Tutin.

618/1×6. Rumex Hydrolapathum Huds. × obtusifolius L. (×R. Weberi Prahl). 6, N. Som.; by a rhine on Walton Heath near Glastonbury, C. I. and N. Y. Sandwith, det. Dr K. H. Rechinger (1948, *Proc. Brist. Nat. Soc.*, **27**, 204).

618/9×1. Rumex conglomeratus Murr. × Hydrolapthum L. 6, N. Somerset; by a rhine on Walton Heath near Glastonbury, Sept. 1942, C. I. & N. Y. Sandwith, det. K. H. Rechinger, 1947, who remarks, "A very rare hybrid."

618/12. Rumex palustris Sm. 56, Notts.; by bridge over the R. Poulter, eastern end of Clumber Park, F. Rose.

§618/16(2). Rumex tenuifolius (Wallr.) Löve. *30, Beds.; Heath and Reach, J. G. Dony, confirmed by J. E. Lousley.

§623/2. Daphne Mezereum L. ‡69, Westm.; in woodland, Hutton Roof Crags, R. A. Boniface, J. H. Lavender and F. Rose; remove brackets in *C.F.* and see Wilson, *Flora*, 213.

†628/2. Euphorbia dulcis L. 49, Caern.; hedgebanks between Bangor and Caernarvon, 1944, N. Woodhead and R. D. Tweed (1947, *N.W. Nat.*, *27*, 117).

628/5. Euphorbia platyphyllos L. 6, N. Som.; Batheaston, Bath, Miss J. D. Millar, 1946/7/8, comm. D. McClintock.

628/11. Euphorbia Cyparissias L. 15, E. Kent; locally plentiful in natural chalk turf (with *Ophrys sphegodes*, *Galium pumilum*, etc.) on the cliffs east of Dover—it is a remarkable fact that on the chalk of southern England this species is often associated with *Galium pumilum* —this is true not only of two Kentish stations, but of those at Sulham, Berks, v.-c. 22, and Loudwater, Bucks., v.-c. 24, F. Rose.

631/1. Buxus sempervirens L. 13, W. Suss.; in thicket on slope of Torberry Hill, Harting, apparently native, E. C. Wallace.

633/1. Ulmus glabra Huds. 16, W. Kent; looks native, in association with ash, beech and oak, on the highly calcareous ragstone; at Rooks Hill, near Sevenoaks; and in a deep valley near Borough Green, F. Rose.

633/6a. Ulmus stricta Lindl. var. cornubiensis (Weston) Moss. 3, S. Devon; Doddiscombsleigh, 1947, A. E. Ellis, det. R. Melville.

†639/1. Helxine Soleirolii Req. 24, Bucks.; earthy bank of R. Thames in willow thicket near Harleyford Manor, Marlow, 1943. E. F. Warburg.

641/1. MYRICA GALE L. 16, W. Kent; still in one good patch (male plants only), on Keston Common:—thus not extinct in Kent as suggested by *Fl. Kent*, 1899 (cf. *B.E.C. 1945 Rep.*, 45); known to others for many years previously, but not known when first seen here (not mentioned for Keston in *Fl. Kent*, 1899, nor in *Woolwich Surveys*, 1909), F. ROSE: recorded by W. Watson as seen in 1921, *Botanical Records of the London Area*, 88, 1935; I collected male catkins in 1925 and have known it there continuously since, J. E. LOUSLEY.

§†651/8. POPULUS ALBA L. *45, Pemb.; cliffs, Goodrich, 1947, J. A. WEBB, comm. NAT. MUS. WALES.

§†656/1. ELODEA CANADENSIS Michx. *102, S. Ebudes; Kiloran Farm Reservoir, Isle of Colonsay, J. CREED and R. A. BOYD, comm. CARLISLE MUSEUM.

§659/1. HAMMARBYA PALUDOSA (L.) O. Kuntze. *45, Pemb.; Bryn Berian Bog, Mrs A. N. GIBBY, comm. NAT. MUS. WALES. 105, W. Ross; bog near the sea, with *Carex limosa*, Red Point, beyond Diabaig, H. MILNE-REDHEAD.

668/1. EPIPACTIS PALUSTRIS (L.) Crantz. 69b, N. Lancs.; Roanhead, near Dalton-in-Furness, G. WILSON, comm. CARLISLE MUSEUM.

674/1. GYMNADENIA CONOPSEA (L.) R.Br. 55, Rutl.; Shacklewell Hollow, F. ROSE.

§680/1. SISYRINCHIUM BERMUDIANA L. sec. Farwell (S. ANGUSTIFOLIUM Mill.). †*69, Westm.; Claife Heights near High Wray, 1947, J. W. G. LUND, comm. T. G. TUTIN.

†683/1. CROCOSMIA CROCOSMIIFLORA (Lemoine) N. E. Brown (TRITONIA CROCOSMIIFLORA Nich.). 69, Westm.; ditch near High Wray and at several places on the shore of Windermere and in adjoining woods, 1947, T. G. TUTIN.

§684/1. NARCISSUS PSEUDO-NARCISSUS L. *44, Carm.; Henbont Lane, near Hendy, J. A. WEBB, comm. NAT. MUS. WALES.

§708/1. LILIUM MARTAGON L. ‡8, S. Wilts.; Stockton Wood, possibly wild, Mr Yeatman-Briggs (1948, *Wilts. Arch. N.H. Mag.*, **52**, 230). *15, E. Kent; abundant, and looking native, in a wood on the North Downs near Ospringe, Mrs VERSCHOYLE, confirmed by F. ROSE.

§709/1. FRITILLARIA MELEAGRIS L. *36, Heref.; wet meadow subject to floods, Upper Lugg Meadow, Hereford, grows sparingly on about two acres of land, Miss M. C. HOPTON, comm. Miss F. H. B. MARSH.

§718/7. JUNCUS FILIFORMIS L. *86, Stirling; shore of Loch Lomond near Balmaha, 1947, R. MACKECHNIE.

§718/14. JUNCUS COMPRESSUS Jacq. 105, W. Ross; delete the record in *Watsonia*, **1** (1), 55, see *Distributor's Report for 1947*.

719/7. LUZULA ARCUATA (Wahl.) Wahl. 105, W. Ross; sparingly on Ben Alligin at 3000 ft., Torridon Forest; more abundant and luxuriant on Slioch, alt. towards 3000 ft., R. MACKECHNIE.

§†724/1. ACORUS CALAMUS L. *105, W. Ross; by small pond, Flowerdale, Gairloch, H. MILNE-REDHEAD and E. C. WALLACE.

§729/1. ALISMA PLANTAGO-AQUATICA L. *105, W. Ross; by small pond, Flowerdale, Gairloch, H. MILNE-REDHEAD.

737/28. POTAMOGETON PECTINATUS L. 70, Cumb.; brackish pool on Newton Marsh, near Newton Arlosh, ELIZABETH WARD, det. J. E. DANDY and G. TAYLOR, comm. CARLISLE MUSEUM.

744/1. CYPERUS LONGUS L. †11, S. Hants.; cliffs at Highcliffe, Mrs G. FOGGITT, comm. J. E. LOUSLEY.

†744/4. CYPERUS ERAGROSTIS Lam. (C. VEGETUS Willd.). 17, Surrey; allotments, Shirley near Croydon, believed to have been introduced with onion seed, 1947, C. T. PRIME, det. and comm. J. E. LOUSLEY.

745/2. ELEOCHARIS UNIGLUMIS (Link) Schultes. 6, N. Som.; marshy meadows by the Land Yeo below Knightswood, Tickenham, C. I. & N. Y. Sandwith, confirmed by S. M. Walters (1948, *Proc. Brist. Nat. Soc.*, *27*, 205). 32, Northants.; in a small peaty marsh fed by calcareous springs from the Oölite, Sutton Heath, R. A. BONIFACE and F. ROSE.

746/8. SCIRPUS PAUCIFLORUS Lightf. 17, Surrey; refound on West End Common, Bagshot, round bomb-crater pools, F. ROSE. 32, Northants.; calcareous marsh on Sutton Heath, R. A. BONIFACE and F. ROSE.

747/1. ERIOPHORUM LATIFOLIUM Hoppe. 106, E. Ross; bog by roadside beyond Aultguish, E. C. WALLACE.

§747/4. ERIOPHORUM VAGINATUM L. 8, S. Wilts.; Landford Common, 1938, Miss E. H. Stevenson (1948, *Wilts. Arch. N.H. Mag.*, **52**, 230). 15, E. Kent; not given in *C.F.* for 15, but "15" is added in *B.E.C. 1945 Rep.*, 45 (1947), on the strength of the following records from *Fl. Kent* (1899): "In the marshes at Cliff's-end, Stonar, and near Sandwich, *Dr Hunter*: *Fl. Thanet*, 60"; the above

are impossible localities for this species of acid bogs and peat moors, as, until their embankment and drainage for pasture in late mediaeval times (see Hasted, 1797, *History of Kent*, Ed. 2, **10**, pp. 102, 158, 219), the " marshes " mentioned were either tidal saltings or below low-tide mark—there is no other record for the species from v.-c. 15, so the " 15 " should be removed from *C.F.*; the species undoubtedly occurred in v.-c. 16 (*vide* sp. in Hb. Tunbridge Wells), but is now believed extinct—F. Rose. *22, Berks.; in good quantity in a bog near Lower Star Post, Bagshot, P. R. Bell and E. C. Wallace.

748/2. Rynchospora alba (L.) Vahl. 15, E. Kent; Hothfield Heath, July 28, 1948, C. N. Pope: sent as an N.C.R. but when reported to F. Rose he replied that the species had been planted there by him for experimental purposes; the record is sent to draw attention to the necessity for giving prompt publicity to all such transplant experiments, J. E. Lousley.

749/1. Schoenus nigricans L. 32, Northants.; Sutton Heath, F. Rose.

753/6. Carex saxatilis L. 105, W. Ross; wet mossy gullies, and on a wet stony plateau, Mealla Chrasgaidh, Fannich Forest, R. Mackechnie and E. C. Wallace.

§753/24. Carex depauperata Curt. *52, Angl.; Holyhead, 1936, A. G. & F. W. Holder, comm. Nat. Mus. Wales.

§753/21. Carex lepidocarpa Tausch. *15, E. Kent; calcareous marsh at Brook; Wingham Fen; Worth Minnis, 1945-47, F. Rose. 37, Worcs.; Park Wood, Nathon, F. M. Day, det. E. Nelmes.

753/23. Carex extensa Good. 70, Cumb.; cliff debris, Fleswick Bay, St Bees, 1948, M. Henderson and C. W. Muirhead, comm. Carlisle Museum.

753/41. Carex atrata L. 96, Easterness; Gaick Forest; deep rocky gorge of Allt Bhrodainn, c. 1700-2000 ft., N. Y. Sandwith.

753/59. Carex Otrubae Podp. 102, S. Ebudes; among rocks by the shore, Kilchattan Bay, Isle of Colonsay, C. W. Muirhead, comm. Carlisle Museum.

§753/65. Carex diandra Schrank. *104, N. Ebudes; bog at Elgol, Skye, 1947, R. Mackechnie and W. A. Sledge.

753/75. Carex dioica L. 32, Northants.; Sutton Heath, in calcareous marsh, R. A. Boniface and F. Rose.

†756/3. Setaria glauca (L.) Beauv. 17, Surrey; cultivated field by West Horsley Place, N. Y. Sandwith.

764/1. Leersia oryzoides (L.) Sw. 13, W. Sussex; margin of lake, Shillinglee Park, panicles poor as plants not with roots in water, but at Amberley Weald Brooks the hot summer and abundance of root moisture caused a magnificent growth in the ditches, 1947, E. C. Wallace.

780/2(2). Agrostis gigantea Roth. 55, Leics.; waste ground, University College, Leicester; garden weed, Wigston Magna; arable field, Woodhouse Eves; all 1946, T. G. Tutin.

780/2(2)a. Agrostis gigantea Roth var. ramosa (Gray) Philipson. 33, E. Glos.; (2a) abundant in one place, Northway, C. W. Bannister, det. C. E. Hubbard.

†780/13. Agrostis avenacea Gmel. 30, Beds.; a wool alien, railway siding, Flitwick, J. G. Dony, det. C. E. Hubbard.

782/1. Polypogon monspeliensis (L.) Desf. 15, E. Kent; dried-up saltmarsh behind the beach, Leysdown-in-Sheppey—new to the Isle of Sheppey, R. A. Boniface and F. Rose.

787/1. Ammophila arenaria (L.) Link. 105, W. Ross; Gruinard Bay, barren; Big Sand, Gairloch, with inflorescence, R. Mackechnie and E. C. Wallace.

†815/1. Eragrostis cilianensis (All.) Lutati. 30, Beds.; a wool alien, railway siding, Flitwick, N. Y. Sandwith, B. Verdcourt and J. G. Dony.

†826(2)/1. Narduros maritimus (L.) Janchen. 57, Derby; well established and persistent for some years on railway track, Clifton goods yard, K. M. Hollick, det. C. E. Hubbard.

†827/1(2). Bromus Gussonei Parl. 25, E. Suff.; Felixstowe Docks. J. E. Lousley and D. McClintock, det. T. G. Tutin.

§827/2. Bromus rigidus Roth. †*25, E. Suff.; Felixstowe Docks, J. E. Lousley and D. McClintock, det. T. G. Tutin.

827/17c. Bromus commutatus Schrad. var. pubens Wats. 45, Pemb.; St David's, C. L. Walton, comm. Nat. Mus. Wales.

827/19(2). Bromus lepidus Holmberg. 55, Leics.; Burrough Hill, by old stack, 1945; Groby, roadside, 1948; and several other localities —in fact not uncommon, T. G. Tutin.

844/2×5. × Equisetum litorale Kuhl. 17, Surrey; ditch near Thorpe, between Chertsey and Virginia Water, A. H. G. Alston and N. Y. Sandwith.

844/9. EQUISETUM VARIEGATUM (Schleich.) Weber. 44, Carm.; hollow on Golf Course, Burry Port, J. E. LOUSLEY and D. MCCLINTOCK.

854/4. POLYSTICHUM LONCHITIS (L.) Roth. 96, Easterness; rocks of Dirc Mhor, west of Dalwhinnie; and rocks of Coire Madagan Mor, Gaick Forest, east of Dalwhinnie, N. Y. SANDWITH.

856/1(2). DRYOPTERIS BORRERI Newm. 33, E. Glos.; (7a) Queen's Wood, Prestbury: Lineover Wood, C. C. TOWNSEND.

§856/11. DRYOPTERIS ROBERTIANA (Hoffm.) Christ. *†19, N. Essex; in considerable quantity on a limestone wall, Steeple Bumpstead, D. PIGOTT.

858/1. POLYPODIUM VULGARE L. 9, Dorset; on sand-dunes at Sandbanks, Poole, J. E. LOUSLEY. 27, E. Norf.; on sand-dunes, Winterton, J. E. LOUSLEY and D. MCCLINTOCK. See *B.E.C. 1946/7 Rep.*, 322 (1948) for a record of a similar habitat, J. E. LOUSLEY.

859/1. CETERACH OFFICINARUM DC. 30, Beds.; brickwork, Leagrave; brickwork, Ampthill, J. G. DONY: brickwork, Chiltern Green, P. TAYLOR.

§863/2. HYMENOPHYLLUM PELTATUM Desv. ‡47, Montg.; moist rock ledges near waterfall, c. 800 ft., Pennant, Llanbrynmair, P. W. RICHARDS—see Hyde & Wade, *Welsh Ferns*, ed. 2, for earlier record.

864/1. OSMUNDA REGALIS L. 24, [Beds.]; New Wavendon Heath, 1947, Miss J. ALLISON, comm. P. TAYLOR.

870/1. LYCOPODIUM ALPINUM L. 57, Derby; near Parwich, K. M. HOLLICK.

870/5. LYCOPODIUM CLAVATUM L. 16, W. Kent; abundant in a disused, boggy, and overgrown sandpit near Ightham, J. FELTON, comm. F. ROSE.

876. CHARA. All gatherings determined by G. O. ALLEN.

§876/3b. CHARA VULGARIS L. var. LONGIBRACTEATA (Coss. & Germ.) Kuetz. *61, S.E. York; Kirkburn, Kelleythorpe Marsh, near Driffield, R. LEWIS. *H.33, Ferm.; shallow pool in quarry near Lisbellow, 1947, E. N. CARROTHERS and R. D. MEIKLE.

§876/3c. CHARA VULGARIS L. var. PAPILLATA Wallr. *6, N. Som.; Nailsea Moor, near Clevedon, C. I. SANDWITH. *27, E. Norf.; Hickling Broad, C. WEST. *30, Beds.; Hinwick, 1947, J. G. DONY. *49, Caern.; Gors Geirch, near Rhydyclafdy, Pwllheli, A. V. JONES. *61, S.E. York; Withernsea, R. LEWIS.

876/4. Chara rudis (A.Br.) Leonh. H.9, Clare; Lake Bunny, J. G. Dony.

§876/5. Chara hispida L. *H.3, W. Cork; Trebawn Bay, O. V. Polunin.

§876/7b. Chara contraria Kuetz. var. hispidula A.Br. *H.33, Ferm.; lakelet (one of the " green loughs ") near Drumcose, 1947, R. D. Meikle.

§876/11. Chara aculeolata Kuetz. *49, Caern.; Pwllheli, A. V. Jones. *108, W. Suth.; Loch Borralie, G. Taylor.

§876/12c. Chara aspera Willd. var. lacustris H. & J. Gr. *108, W. Suth.; Loch Borralie, G. Taylor.

§876/16a. Chara globularis Thuill. var. capillacea (Thuill.) Zanev. *H.9, Clare; Lake Inchiquin, 1947, J. G. Dony.

§876/17. Chara delicatula Ag. *102, S. Ebudes; roadside ditch, Milbuie, C. W. Muirhead; brackish pools near Dun Gallain, Isle of Colonsay, J. Creed & R. A. Boyd; comm. Carlisle Museum.

§876/17b. Chara delicatula Ag. var. barbata (Gant.) Gr. & B.-W. *H.9, Clare; Ballyeighter Lough, J. G. Dony.

§876/17c. Chara delicatula Ag. var. annulata (Wallm.) Gr. & B.-W. 108, W. Suth.; Loch Borralie, G. Taylor. *H.33, Ferm.; Monawilkin Lough, 1947; Lough Navar, 1948; Lough Lattone, 1948; Lough Aguse, 1948; near Derrygonnelly, 1947, R. D. Meikle.

OBITUARY

JOHN PERCIVAL (1863-1949). The work of the late Professor John Percival in the teaching and research of agricultural botany, and especially on wheat, is so widely known and respected that his interest in field botany is apt to be overlooked.

He was born at Carperby, near Aysgarth, in Wensleydale, Yorks., on 3rd April 1863, and while still a student wrote a " Flora of Wensleydale " (*The Naturalist* for May and June 1888) which listed 653 species and varieties, of which nearly all had been seen by himself. A record of a moss, *Plagiothecium nitidulum* Wahl., from Penyghent, as found by him with J. Whitehead in 1879, is given in *Bot. Trans. York Nat. Union*, *1*, 89 (1891). A number of very rare Hawkweeds gathered by him in Yorkshire are cited in Pugsley's *Prodromus*.

Percival graduated from St John's College, Cambridge, in 1888 and was appointed Professor of Botany at Wye Agricultural College on its foundation in 1894. Six years later his *Agricultural Botany* was published: a work which was to run to eight editions and to serve as a standard text-book for a generation. In 1902 he took up an appointment at University College, Reading, where he became Professor of Agriculture and later Professor of Agricultural Botany. This appointment he held until his retirement in 1932, by which time the College had become the University of Reading.

At Reading he founded a living museum of the cultivated wheats of the world which took the form of living plants, of which the seed has to be sown every second year. From this he distributed dried material and live seed and on it he based his books on *The Wheat Plant*, 1921, and *Wheat in Great Britain*, 1934 and 1948. He published many papers and several other books on various aspects of agricultural botany.

Professor Percival was a member of this Society from 1910 until about 1931 and contributed occasional notes to our *Reports* and was a valued correspondent of our late Secretary, Dr G. Claridge Druce. He joined the Linnean Society in 1893, was on the Council 1925-29, and a Vice-President of that Society, 1926-27. His herbarium is in the Department of Agricultural Botany of Reading University. He travelled to Lapland, the Alps, the Pyrenees, and to the Welsh mountains. He died on 26th January 1949.

A more detailed notice by Professor W. B. Brierley will be found in *Nature*, **163**, 275. I am indebted to this and to Professor T. M. Harris of Reading University for some of the information contained in this account. J. E. LOUSLEY.

REVIEWS

Flora of Gloucestershire—Phanerogams, Vascular Cryptogams, Charophyta. Edited by H. J. Riddelsdell, G. W. Hedley, and W. R. Price. Pp. clxxxii, 667, col. frontisp., pls. xliii, 2 maps inset to text, 4 maps in back cover pocket. Published by the Cotteswold Naturalists' Field Club, c/o The Art Gallery and Museum, Cheltenham; printed by T. Buncle & Co. Ltd., Arbroath; 1948. Price 2 Gns.

At last a striking gap in our collection of County Floras has been filled, and we must congratulate the Field Club and its Editor on the production. Gloucestershire is a large county, and its flora is very interesting, as the work shows. The book will take its place among the good Floras, and if there is still a good deal to criticise, there are new features to be commended. It is, as usual with Buncle's work, well printed; the numerous illustrations of vegetation and scenery, and of interesting species, being mostly very good and some really beautiful, though I am fearful of losing my plates xiv/xv which arrived only half sewn. In addition to the map showing the botanical districts, we are given the County Council's coloured maps of soils, grasslands, and surface utilisation, and black and white maps of geology and rainfall among the text. The font used for the names of aliens is too inconspicuous: it is at times difficult not to overlook these records.

The botanical subdivisions, which ignore the division of the county into vice-counties, were made by Riddelsdell "roughly to represent drainage areas," so that we cannot immediately see which of the localities in divisions 2, 6, and 7b fall into which vice-county, which is a pity, as it could easily have been indicated, but the vice-county distribution of each species, including that of neighbouring vice-counties, is given immediately after the species name. The date of the first record for each vice-county is, however, given after the records. The true vice-county boundaries are fully explained, based on maps prepared by the boundary section of the Ordnance Survey, which, it should be added, were made at my request. A drainage system is indeed the most generally suitable basis for a distributional district, but scarcely, as the Editor suggests, "a physiographic unit combined with its vegetational type," for the latter will depend on so many factors that it will never have a precise boundary.

The long Introduction deals successively with geology (by L. Richardson, F.G.S.), the geological history and its influence on physiography, the superficial deposits, climate, prehistoric vegetation (from peat deposits), vegetation and altitude, vegetation, woodlands, changes due to the war in the Ashchurch area (by C. W. Bannister), agriculture, vice-county boundaries, botanical districts, botanical statistics (comparison

with adjacent counties), history of botany in the county (with useful index), lists of records and of specialists and herbaria consulted, plan of the Flora, lists of signs and abbreviations. From which it can be seen that the final editor, W. R. Price, has been at great pains to make the Flora complete, as most of the items seem to have been prepared by him. But one may here add that it is a pity that the page headings throughout the work give no indication of what the pages contain. In the Introduction even the heading " Flora of Gloucestershire " is omitted, and the indication of the section, or of the genus in the body of the work, would have saved unnecessary turning of pages and waste of time.

The Flora was based on a MS. by Riddelsdell, and the " whole Flora undertaking " was " reorganised " by Hedley " at a time when there was a real danger of its lapsing," without whose interest " it is doubtful whether the Flora would have been completed." But both of these died in 1941, and though the appearance of their names on the title-page is understandable (though " the late " should have been added, one feels), the real work of editing must have been done by W. R. Price, to whom a debt of gratitude is due that it has been completed.

A few comments on the Introduction are best made here. The items are well done and pleasant to read, but under Vegetation the view is held that " it is probable that a sparse tundra type of vegetation, which no doubt resembled that existing in Greenland to-day, survived the rigours of the last glaciation." If the writer had put " the maximum glaciation " he would have had supporters, but in any case comparison with Greenland, so much farther to the north and without an ocean to its west, is, as I have frequently remarked, an unjustifiable one. It is difficult not to avoid the conclusion that *Sorbus bristoliensis*, only known from the Avon Gorge, is probably, like other endemic restricted *Sorbi*, a survival of that glaciation, together with the remarkable series of other local Avon Gorge species. Such statements are best avoided when they are unsupported by any evidence. Regarding the woodlands, the green line of beechwood on the narrow outcrop of carboniferous limestone on the Forest of Dean escarpment above Coleford appeared to me in 1912 to indicate that beech was native in Britain, a fact since proven by pollen-analysis, though Tansley would not agree at the time. The historical section is well done and interesting, though it is difficult to understand the order of entries which, though generally in historical order, departs from dates of both births and deaths. G. E. S. Boulger's part in the production is properly recognised. Under Plan of the Flora it is not clear whether the remarks on the term " Native " are due to Riddelsdell or not, but surely that term should be restricted to those species which arrived without the assistance of man, i.e., by " natural " processes. For though man is part of Nature, much of the interest in the study of distributions lies in eliciting therefrom the botanical history of the area and the principles of natural distribution without the interference or assistance of that rather unnatural species, man, whose activities have con-

siderably obscured at times the movements of plants; i.e., distribution without the aid of his ships and his habit of moving about all over the place regardless of topography, climate, and other factors which, until his advent, controlled the distribution of species. Thus, though it is stated, that doric type is used for natives, it is also used for denizens such as *Geranium striatum* and *G. phaeum*. In my opinion, the test of " native status " should be the ability to refer the species to one or other of the natural ecological associations which occur in the area. If a species cannot with certainty be listed as a constituent of any natural association in the area its native status is suspect. Study of our British species from this angle is needed: *Lamium album* is presumably only a denizen, whereas *Galium Aparine* is native as a constituent of maritime shingle in many places, and *Stellaria media* seems to be a constituent of some northern maritime sand associations. Further information may be expected from study of our post-glacial deposits.

There are many criticisms that can be made about this and that in the main body of the work, but before making any one may commend the insertion of a gazetteer of place names, and the serious attempt at a bibliography, which, however, is not complete. The latter should have contained references to where descriptions of many of the varieties listed could be found. There are too many worthless varieties included without comment. Records of them must be included for completeness, but when they are worthless it could have been incidental mention: *Sagina procumbens* var. *spinosa* is an example. The work is, perhaps unavoidably, uneven, inasmuch as all available sources of information have not been tapped. No County Flora can be thoroughly done without investigation of material available at the British Museum. *Salicornia* contains no mention of *S. dolichostachya*, although Marshall's Beachley specimens were so determined by Moss, and the obvious course would have been to collect material and send it for determination. The Severn form of *Cochlearia anglica* is the var. *gemina* Hort, originally described from the Wye. Riddelsdell's herbarium was not revised. It is stated that Nelmes has investigated the herbarium material of *Carex* of the British Museum, but this is incorrect.

The nomenclature is open to a good deal of criticism. Initial capitals are sometimes used where required in specific epithets, and sometimes not. A County Flora is not the place to make innovations in nomenclature, for foreigners will need to investigate them, and it is not proper to require that to do so they must buy such works. Although an attempt to meet this difficulty to some extent has been made in the form of a list of new names and combinations made (p. 624) the necessity of citing these as of " Airy Shaw in Riddelsdell, Hedley and Price " is something that should have been avoided by their prior publication elsewhere. For the same reason new species should not have their original publication in such a work, especially as I understand that inadequate surplus is available for foreign purchase. Some of the names

used have long ago been shown to be wrong. An instance is *Galium hercynicum*, used for *G. saxatile* L., due to Linnaeus's erroneous assumption that Barcelonette was Barcelona in " Hispania," where the plant does not grow. *Carex filiformis* L. should not have been used for *C. tomentosa* until the necessity for the change was fully established. There has been too much of this hurried change of name without full investigation, and County Floras should always be somewhat conservative in this matter. " Goüan " on p. 236 is a curiosity, and I know no justification for " *Oe.*" to indicate *Oenothera*, since Linnaeus does not use a dipthong. There is rather too much tendency to accept foreign work in preference to existing British practise, as under *Viola tricolor* L. Again, a local Flora is not the place to introduce such things, and in this case it seems to be to show ignorance of the group. I could continue, but forbear. When a group has been revised by an expert, as *Ulmus*, *Carex*, and grasses, a local Flora, as here, benefits greatly, but anything of more than local interest should be published elsewhere. In the last two mentioned, the addition of keys for identification may be of much assistance to local botanists, and, indeed, the addition of the characters of some of the varieties mentioned elsewhere would have been of even more value when they are not to be found in the usual British Floras. Sometimes additional information would have been helpful in other cases. For instance, I am not clear what the St Brody record of *Orobanche crenata* (p. 372) rests on. If his specimen were an " imported " one of another species, and of the species he actually records, how does one *know* that the Stroud plant was in fact *O. crenata*? Failure to indicate this may cause enquirers to waste time.

Owing to the considerable time during which the work was being printed, an appendix of Addenda and Corrigenda was appended, to which were added revisions of the names of the *Rubi* and *Hieracia* according to Wm. Watson and Pugsley respectively. It may be wondered whether it is ever desirable to start printing until the MS. of a work is all ready, but one must not criticise unduly, when the main feeling is one of thanks for the production of such a useful work.

A. J. Wilmott.

Drawings of British Plants. Stella Ross-Craig. Part I: Ranunculaceae; 44 plates; 6/- net. Part II: Berberidaceae, Nymphaeaceae, Paperaveraceae, Fumariaceae; 22 plates; 4/6 net. 1948. London: G. Bell & Sons, Ltd.

The two volumes under review represent the first two parts of a series which, when completed, will comprise illustrations of " all the thoroughly established flowering plants found growing wild in Britain," and in which it is proposed to incorporate eventually some 1,500 to 1,800 plates. The illustrations, which consist of excellent black and white line drawings subtended by brief explanatory legends, are prefaced by a foreword by Sir Edward Salisbury, followed by an explanatory introduction by the artist herself.

In accordance with inevitable restrictions of space, time, and the present state of general taxonomic knowledge, Miss Ross-Craig has had to impose a certain arbitrary but clearly defined limit to her range of subjects. Hence certain critical species and micro-species, varieties and forms, casuals, and chance escapes have been purposely excluded (possibly only as an interim measure).

The plates may perhaps most profitably be considered in relation to the three-fold function assigned to them by Sir Edward Salisbury in his prefatory remarks, namely, (a) as aids to identification, (b) as scientific documents, and (c) as objects of aesthetic pleasure. Of these, the second appears to tally most closely with the artist's own conception of their purpose " to provide a *standard* set of illustrations which will be useful, *for reference*, to all who are interested in the study of plants " (italics inserted).

As aids to identification, the actual illustrations may be very highly commended indeed. Not only have the specimens from which they were drawn the authenticity invariably associated with productions by Kew personnel, but the illustrations themselves combine scientific accuracy in minute detail with very clear and characteristic representation of the general habit and gross morphology of the individual species. A more debatable point concerns the *manner* in which the plates can best be used in identification by the students and teachers for whom it is avowed the illustrations are especially intended: in the absence of an accompanying text or key, the temptation will be very great to revert to the unscientific practice of " matching up the specimen "—a deplorable habit (though often very convenient!)

The main criticism which must be levelled at the conception of the plates as scientific documents—" a standard set of illustrations . . . for reference "—is the complete omission of all factual data concerning the origin of the actual individual plants portrayed. Very little extra space would have been required to insert at least the localities from which the specimens were gathered, and the value of the plates would have been greatly enhanced by the inclusion of such information. Moreover, although Miss Ross-Craig stresses that her specimens have been *compared* with specimens at Kew, it would be useful to know also whether a duplicate set of the actual specimens drawn is available in the Kew Herbarium for reference.

From the aesthetic point of view, the great majority of plates are very pleasing, with their subjects well arranged to fill the available space to the best advantage. In a few cases, however (notably in Part I, Plates 3, 5, 6, and 28, and in Part II, Plate 14), the general effect is confusing, due partly to the large size or diffuse habit of the specimens concerned, and inevitably associated with the very commendable effort to produce comparable drawings on the same scale throughout the series.

In looking back over the two volumes as a whole, as representing the fore-runners of an enterprising and ambitious series, it seems a

real matter for regret that the very considerable taxonomic research which has obviously gone into their production should not find expression in a brief related text issued simultaneously in companion volumes. Failing this, a short description of the main diagnostic features of each species, together with a brief mention of any important varietal forms omitted from the illustrations, might well be inserted opposite each plate. The work as it stands at present is somewhat tantalising.

J. M. LAMBERT.

PUBLICATIONS

A revision of the list of publications available for sale which appeared in Year Book, 1949, may be obtained from the Hon. General Secretary, to whom all orders should be addressed.

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being the Report of the Conference on "The Study of Critical British Groups," arranged by the Society in 1948. Edited by A. J. Wilmott, may be obtained from the Hon. General Secretary. Price 10/-, plus postage. Copies have been circulated free to all who were members of the Society in 1948.

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of the British Isles

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[Continued on Inside Back Cover]

GRAY HERBARIUM
July 28, 1950
HARVARD UNIVERSITY

OBSERVATIONS ON SOME SCOTTISH WILLOWS

By K. H. Rechinger,
Vienna.

When staying at Dundee in August and September 1947 as a foreign guest to the Meeting of the British Association, generously granted by the British Council, I had the opportunity to join some excursions. My host, Mr W. Ogilvie of Carnoustie, interested in both Astronomy and Botany, accompanied me to Barry Links west of Carnoustie which proved an almost unique locality for the lowland species and hybrids of *Salix*. It is situated between the dunes. The lowest and dampest ground is covered with dense carpets of *Salix repens* (*s.l.*), nearer to the margins of the depressions grow various species of *Salix*. The most common species besides *S. repens* (*s.l.*) are *S. viminalis*, *S. nigricans*, *S. aurita* and *S. atrocinerea*; *S. caprea*, *S. purpurea* and *S. alba* being more or less scattered; and *S. fragilis* and *S. pentandra* rare. *S. daphnoides* and *S. dasyclados* are very probably planted or escaped from cultivation. The uppermost slopes of the dunes are covered chiefly with *Hippophaë*.

Any observations on willows must remain, of course, incomplete when based on leaves only. But my friend, Dr George Taylor, has encouraged me, nevertheless, to publish a short account which may not be quite useless, as a stimulus to a more skilful investigation.

Angus, and even Barry Links, is not at all a *terra incognita* in a salicological respect. That is made evident by the very careful collections of the late Mr and Mrs Corstorphine of Arbroath to which I had access through the kindness of Dr G. Taylor now in charge of their herbarium. But when compared with the neighbouring, almost classical, district of Perthshire, explored chiefly by F. Buchanan White, there seems still much to be done in Angus. Even since White's excellent Revision of the British willows (1890) and Linton's Revision (1913) were published, opinions on the delimitation of several species have changed. Progress is due especially to Enander (1907; 1910), Floderus (1931), Goerz (1922) and Camus (1904), so that even the account in White's *Flora of Perthshire* needs to be brought up to date in some respects.

It must be emphasised, however, that a good deal of this more modern progress was at least foreseen by White. He was still not aware of the decisive characters of some critical species, but he was in fact apparently able to distinguish them by his extremely careful observation, his practical experience and his eminent sense of natural grouping. For example, the now generally accepted identification of the British plant, formerly included under the name of *S. cinerea*, with the western European *S. atrocinerea* Brot. could not be established by White only on account of the lack of more ample continental material. Likewise the distinction of *S. coaetanea* from *S. caprea*, established by Floderus on Scandinavian material, and even the distinction and clearer delimitation of *S. nigricans* and *S. phylicifolia*, due to Enander, were foreseen by Buchanan White.

The scope of these few lines is:—(1) to investigate how far the experience of a continental salicologist could be applied to British willows, (2) to call attention to certain differences in the range of variability of some willows on the Continent and in the British Isles, (3) to show the different tendency to hybridization between certain species on the continent and in the British Isles, which may perhaps be partly due to whether the flowering periods overlap or not.

Numbers quoted refer to dried specimens, duplicate sets of which have been deposited at the British Museum (Natural History) and at the Angus Herbarium.

Salix nigricans Smith emend. Enander. For citation of authors see Enander (1910) and Goerz (1922). This species is well known as being one of the most polymorphic of the genus. This fact is evident when glancing through the treatments by Seemen (1908), Toepffer (1915) or Goerz (1922). There has been much disagreement on the delimitation of this species, especially in respect to the ovary, i.e., whether a glabrous one is characteristic or whether varieties with hairy ovaries should be admitted within the range of variability. According to Enander glabrous ovaries only occur in *S. nigricans* and pilosity—even a scanty one—on the ovary always proves hybridization—in Scandinavia very frequently with *S. phylicifolia*, and in Central Europe with species of the *Capreae*, especially *S. cinerea*. Recently Grapengiesser (1943, 230) has rejected this opinion but his arguments do not seem to me to be conclusive.

There is still another character very useful in distinguishing *S. nigricans* from similar species in Scandinavia and in the British Isles, especially from *S. phylicifolia*. This is the bloom on the lower surface of the leaves, always present and going right up to the apex of the leaf in *S. phylicifolia*, but fading, when present at all, towards the apex in *S. nigricans*. These characters are very useful when dealing with sterile material and when considered together with the tendency of leaves in *S. nigricans* to turn black in drying. *S. phylicifolia* has glabrous shoots and is generally more glabrous than *S. nigricans*.

To decide whether a species of the *Capreae* has to be considered as taking part in hybridization with either *S. nigricans* or *S. phylicifolia*, one has in the first place to examine the striae (Latin *vibices*, German "Striemen"), i.e., prominent longitudinal lines on the decorticated wood visible on wood as young as one year old in genuine *S. aurita* and *S. cinerea*, and on wood two to five years old in hybrids of these species with species lacking striae. Hybridization between *S. nigricans* and almost the only estriate species of the *Capreae*, viz. *S. caprea* itself, is extremely rare, and even *S. caprea* × *phylicifolia* (as which *S. laurina* Sm. has been interpreted in the past) is rather rare.

On Barry Links I was astonished to see that variability of *S. nigricans* is even greater than in Central Europe and partly in different directions. One must, of course, admit that when dealing with sterile material only, any suggestion must remain tentative. But in Central

Europe I never came across so many forms of *S. nigricans* with so slight —or nearly completely lacking—a bloom on the lower surface of leaves as in Scotland (no. 73, 77). At the same time a sort of pilosity on leaves and shoots, which cannot be regarded as being derived from crossing with a species of the *Capreae*, occurs much more frequently in Scotland (nos. 33, 46, 57). Theoretically, pilosity could even be derived from *S. arenaria* or *S. viminalis*, both of which occur very frequently on Barry Links. But the quality of the glossy, but rather coarse and not appressed hairs, not at all silky and smooth as they are in these two species, does not permit this suggestion.

Nearly glabrous forms of *S. nigricans*, which seem to extend the range of variability in the opposite direction, might be derived from hybridization with *S. phylicifolia*, but this has still to be proved by flowering material. I did not find any shrub of genuine *S. phylicifolia* at Barry Links.

S. VIMINALIS L. One of the most striking features was to see *S. viminalis* crossing much more freely than in Austria and adjacent regions. Further study is needed to explain this fact, which might perhaps be due to the flowering periods of the different species (which may overlap in more northern latitudes) or to a different genetic nature of the same species in different regions. The influence of *S. viminalis* is usually very easily recognized by the more elongated leaves being more or less entire and having more lateral nerves, and by the somewhat silky indumentum, especially in younger leaves. Very often the characters of *S. viminalis* are so predominant in its hybrids that the other parent can only be guessed at, especially when this is thought to be a member of the *Capreae*. Indeed, authors do not always seem to be very successful when trying to separate the different hybrids of *S. viminalis* with the *Capreae* (see the varieties of *S. stipularis* in White's (1890) and Linton's (1913) treatments). Triple or even more complicated hybrids may often occur, as all the hybrid combinations of the species within the *Capreae* are usually rather common and fertile. Here again estriate wood suggests *S. caprea*, especially when combined with a very thick and rather woolly indumentum on the lower surface of the leaves. When striae are present, small, short and more or less corrugated leaves indicate the influence of *S. aurita*, and in most of the other cases *S. atrocinerea* may be suggested as being the other parent.

A plant which I think is *S. atrocinerea* × *viminalis* or perhaps *S. atrocinerea* × *caprea* × *viminalis* (no. 9, 55) is rather frequent on Barry Links. But there occur also forms so near to *S. viminalis* that they might easily be taken for genuine *S. viminalis* if they did not show striae and slightly broader leaves, suggesting an ancestral influence of *S. atrocinerea* (no. 39).

S. DASYCLADOS Wimmer, 1848, *Flora*, Regensb., **31**, 333; Andersson, 1867, *Botaniska Notiser*, **61**; Floderus, 1931, *Sal. Fennoskand.*, 141; ? *S. acuminata*, *S. mollissima*, *S. Smithiana* auctorum p.p.

S. dasyclados has been usually included by British botanists in the series of hybrids between species of the *Capreae* and *S. viminalis*. The question whether it is a species or of hybrid origin is still open to discussion. In any case it must be stated that it has certain very distinct characters and seems to be much less variable than many good species. I include here a short description partly translated from Floderus (1931, 141).

Tall shrub or almost a tree with striae on the older branches. Shoots long, very vigorous, c. 4, rarely 7 mm., thick, densely covered with dark grey spreading intricate hairs. Leaves stipulate, with rather long petioles, very long, more or less narrow lanceolate, rather deeply serrate, with many lateral nerves, more or less glaucescent beneath, when young often blackening when dried and more or less glossy white pubescent; older ones becoming glabrous on the upper surface and more or less loosely grey pubescent. Peduncle of catkin short, with small leaves. Catkin thick. Bracts very broad, dark brown. Nectaries long. Capsules nearly sessile, pubescent. Style and stigmata very long.

On Barry Links a group of large treelike bushes (no. 28).

Most characteristic are the very numerous lateral nerves, often nearly at right angles to the midrib. Some of the characters are apparently transmitted to hybrids, and cannot be explained otherwise than by the influence of *S. dasyclados*.

For further study of this still insufficiently known plant, it would be desirable to decide whether or not it is indigenous in the British islands and to collect more exact information on its distribution. By study of the type specimens on which the names tentatively cited above as synonymous are based an older valid name might possibly be found.

S. dasyclados × **purpurea**; × **S. Taylori** Rech. fil., hybr. nov.

Frutex elatus ramis crassis atris, annotinis glabrescentibus vibicibus sparsis tenuibus sed distinctis, ramis hornotinis pilis intertextis pallide cinereis dense obsiti. Petioli 8-10 mm. longi. Folia subtus valde glabrescentia, pilis secus nervum medianum tantum diutius persistentibus. Lamina oblonga vel oblongo-linearis, supra medium latissima, latitudine 3½-4½-plo longior, basi cuneata, apice acuminata, margine imprimis apicem versus crenulato-serrata, supra atro-, subtus pallide viridis. Nervi secundarii numerosissima, 25 usque ultra 30. Ad *S. purpuream* foliis valde glabrescentibus, supra medium latissimis, apicem versus imprimis serratis, colore et consistentia foliorum quoque accedit. Ad *S. dasycladon* accedit vibicibus, ramis crassis, nervis lateralibus numerosis, indumento, foliis multo longioribus et latioribus.

SCOTLAND, Angus, Barry Links near Carnoustie, among the parents, September 1947, *K. H. Rechinger* no. 19. Typus in Herb. Mus. Brit.

S. ARENARIA × VIMINALIS. One bush at Barry Links (no. 49) about 1 m. high, showing exactly intermediate characters, differing from *S. arenaria* by taller growth, narrower, longer leaves (3.5-5 : 1) with many more (10-12) lateral nerves, and tending by these characters towards

S. viminalis. The indumentum on the lower surface of leaves is extremely silky. Small narrow stipules as in *S. arenaria* are partly developed on the shoots. There is but one character which might suggest an influence of still another species, viz., that the lenticels on the three-year-old decorticated wood are not punctiform as in *S. repens* (cf. Goerz 1922) but more or less elongated and like striae. An influence of *S. atrocinerea* or *S. aurita* might be suggested by this.

S. arenaria × **atrocinerea** × **viminalis**; × **S. angusensis** Rech. fil., hybr. nov.

S. arenaria × *viminalis* similis sed frutex elatior: vibices numerosiores distincti; rami multo crassiores; foia proportione latiora, breviora (3-4: 1), supra sordidea atro-virescentia. Ad *S. arenariam* habitu generali indumento sericeo et forma foliorum ramorum breviorum: ad *S. atrocineream* ramis crassiusculis atris rugosis praecipue autem vibicibus, colore foliorum paginae superioris, nervatura supra distincte immersa, stipulis latiusculis, ad *S. viminalem* forma ac indumento foliorum ramorum hornotinorum, nervis lateralibus numerosis (15-20) accedens.

Scotland, Angus, Barry Links near Carnoustie, September 1947, *K. H. Rechinger*, no. 45. Typus in Herb. Mus. Brit.

S. atrocinerea × caprea × viminalis. See Chassagne et Goerz (1931, 79). Barry Links (no. 55). Probably a new record for the British Isles.

S. atrocinerea × nigricans. This hybrid occurs in many individuals at Barry Links (no. 23, 42, 58 ?). Most of them are very similar to *S. nigricans* (no. 23), that is, its coarse and silky hairy form, and differ from it by the possession of striae and by the duller green upper surface of the leaves. The interpretation of some other individuals nearer to *S. atrocinerea* is rather doubtful.

S. atrocinerea × viminalis; ×S. Chouardi Chassagne et Goerz (1931, 79).

Barry Links (no. 9). Already indicated from England; between Thirsk and Kilvington, North Yorkshire, leg. *J. G. Baker* as *S. ferruginea* (Billot no. 3678).

CAMUS, A. & G., 1904, *Classification des Saules d'Europe*.
CHASSAGNE, M., & GÖRZ, R., 1931, Salix nouveaux de France, *Bull. Soc. Dendrol. France*, **1931**, no. 80, 67-88.
ENANDER, S. J., 1906, *Schedae ad Salices Scandinav. exsicc. II.*
——, 1910, *Schedae ad Salices Scandinav. exsicc. III.*
FLODERUS, B., 1931, *Salicaceae Fennoscandicae*, Stockholm.
GÖRZ, R., 1922, Norddeutsche Weiden, *Repert. Sp. Nov.*, Beiheft **13**.
GRAPENGIESSER, 1943, Crux Salicum, *Svensk Bot. Tidskr.*, **37**, 223-240.
LINTON, E. F., 1913, Monograph of the British Willows, *J. Bot.*, **51**, supplement, 1-92.
SEEMEN, O., 1908-09, Salix in ASCHERSON & GRAEBNER, *Synops.*, **4**, 54.
TOEPFFER, A., 1915, Salices Bavariae, *Bayer. Bot. Ges.*, Bericht **15**; München.
WHITE, F. B., 1891, A Revision of the British Willows, *J. Linn. Soc. Bot.*, **27**, 333.
——, 1898, *The Flora of Perthshire*.

MINT NOTES

By R. A. Graham.

II. MENTHA GRACILIS SOLE, AND ITS RELATIONSHIP TO MENTHA CARDIACA BAKER.

×Mentha gentilis L., 1753, *Sp. Plant.*, 577.

Verticillate mints, with campanulate glabrous glandular calyx-tubes, hairy calyx-teeth, and glabrous pedicels.

1. Subhybr.† *gentilis*. Leaves broadly ovate-lanceolate.
2. Subhybr. *gracilis*. Leaves narrowly ovate-lanceolate.

×*M. gentilis* has been considered to be *M. arvensis* × *M. spicata*, and *M. gracilis* to have arisen from the same two parents, Fraser denoting it as *M. arvensis* × *M. gentilis*. It is probable that the relationship between ×*M. gentilis* and ×*M. gracilis* is close, but owing to the fact that the cytology of the two is as yet unknown, and due to the usually-marked difference in outward appearance arising from the difference in leaf shape, it is advisable to keep the two groups temporarily differentiated as subdivisions of the hybrid group *M. gentilis*.

1. Subhybr. † gentilis (L.) R. A. Graham, comb. nov. This group is not the subject of this paper, and will be dealt with on a subsequent occasion.
2. Subhybr. gracilis (Sole) R. A. Graham, comb. nov.
   Var. a. gracilis (Sole) Fraser.
   M. gracilis Sole, 1798, *Menthae Britannicae*, 37; Hull, 1799, *British Flora*, 129.
   M. gracilis α Smith, 1800, *Trans. Linn. Soc*, **5**, 210.
   M. cardiaca Baker var. 2 *M. gracilis* "Sole, t. 16. non Brown," Baker, 1865, *J. Bot.*, **3**, 246.
   ×*M. gentilis* L. var. *gracilis* (Sole) Fraser, 1927, *B.E.C.* **1926** *Rep.*, 241. [Fraser is in error in attributing the first use of the epithet to Smith.]

The three essentially identical specimens, which I have accepted as type material, are among Sole's set of mints at the Linnean Society. These should be consulted together with Sole's text in *Menthae Britannicae*.

Sole's typical *M. gracilis* is a greenish, rather slender, leafy mint, with few, rather short, mainly barren branches. *Stem* greenish-purple,

†As there appears to be no satisfactory term in current use for well-marked subdivisions of a hybrid analogous to subspecies, the Publications Committee has suggested the use of the term *subhybrid*.—Ed.

hairy above but very thinly so below. *Leaves* narrowly ovate-lanceolate, broadest rather below the middle, tapering to each end, and on footstalks up to 6 mm. long; thinly hairy throughout but with more hairs on the whitish veins of the subsurface; lamina up to 4.8 × 1.7 cm.; serratures shallow but rather sharp, irregular in depth and spacing, up to 11 on each edge. *Bracts* (also known as bract—or floral—leaves) similar to the leaves, gradually but in mature plants not greatly decreasing in size upwards. *Calyx* similar to ×*M. gentilis* L., campanulate, glabrous, glandular, the teeth ciliate with white hairs. *Pedicels* purple, glabrous. *Inflorescence* leafy, of 11 to 13 rather few-flowered verticils which are almost entirely confined to the main stem, the lowest pedunculate. Not having seen fresh material I am unable to comment on the scent. This is evidently a very rare mint.

Var. b. CARDIACA (Baker) Briquet.
M. cardiaca Baker, 1865, *J. Bot.*, **3**, 245.
M. gentilis Sole, 1798, *Menthae Britannicae*, 36 [non L.].
M. gracilis γ Smith, 1800, *Trans. Linn. Soc.*, **5**, 211.
×*M. gentilis* var. *cardiaca* Briquet; Fraser, 1927, *B.E.C.* **1926** *Rep.*, 241.

Baker's type specimen (1865), which is a poor and decapitated plant, is at the British Museum. With it is another sheet bearing two excellent specimens from cultivation at Kew in the following year. We are not told whence the type came, but it seems at least likely that the Kew specimens were obtained from cultivation of type material. These latter are different from type in growth form, and in order to understand *cardiaca* it is necessary to consider them as well as the type.

Baker's description is generally excellent. I find, however, that the stem is almost glabrous above, and with a few scattered hairs below; the leaves are broadest rather below the middle, and taper to both ends with an entire base, and whereas the lower leaves are on footstalks up to 3 mm. long the upper bracts are almost sessile. The upper surface bears a few hairs on the veins while on the undersurface there are rather more hairs on the veins and scattered generally over the surface. Fortunately the specimen was figured, so that it is possible to know the form of the inflorescence which, being decapitated, would otherwise have remained in doubt. Like *gracilis* it is leafy, the uppermost measurable bract being 1.3 cm. long.

Type *cardiaca* differs from *gracilis* in that the stem is far less hairy; the leaves and bracts are on shorter stalks or sessile, and the whole plant is evidently less slender. It is also likely that in *cardiaca* there are more verticils, each with a greater number of flowers than in *gracilis*. But the two have considerable resemblance, and identification will doubtless present difficulty to the inexperienced, especially in view of variation in characters. It is likely that many gatherings will be found to be intermediates between the two, and Baker's statement that *gracilis* may be a weak form of *cardiaca* is probably true.

The two cultivated specimens are similar to type in most essentials, but the form of the plant is very different. Owing, perhaps, to conditions, the inflorescence of these is markedly subspicate, and this appearance is caused by the many verticils being crowded towards the apices of the many branches, and to the great reduction in size of the bracts upwards. These become as short as 8 mm. in length, thus giving a non-leafy appearance to the whole inflorescence. This form of *cardiaca*, which is Sole's *M. gentilis*, is easily told from *gracilis*, which, being a weaker plant, would, I think, be unlikely to vary to a markedly subspicate form.

The type, as shown in the specimen and figure, is more general than the subspicate form, though *cardiaca* cannot be regarded as a common mint. Being extensively cultivated in gardens it is, so far as I know, always an outcast, and is therefore to be met with wherever gardens are near.

In Sole's set of mints at the Linnean Society there is a closely allied specimen called *M. glabra* (the name is invalid, being antedated by *M. glabra* Miller, a form of *M. spicata* L. em. Huds.), which is an intermediate between *gracilis* and *cardiaca*. The lower leaves are on stalks of considerable length, while the upper bracts are almost sessile; the stem is glabrous; and the inflorescence leafy. In addition the calyx teeth are far less hairy than either *gracilis* or *cardiaca*. The affinity is nearer to *cardiaca*, though the long stalks of the lower leaves are a character of *gracilis*. It is rather surprising that Sole did not recognise this mint as being related to the *gracilis* group, indeed he thought it to be a form of his *M. praecox*, which, as we now regard it, is a variety of *M. arvensis* L.

III. A VARIETY NEW TO THE BRITISH LIST.

MENTHA LONGIFOLIA (L.) Huds. var. HORRIDULA Briquet. Judging from Briquet's (1891, *Labiées des Alpes Maritimes*, 50) description, and especially from his specimens in the Conservatoire at Geneva, this would appear to be the mint which Fraser in his Monograph (1927, *B.E.C.* **1926** *Rep.*, 222) called "×*Mentha Nouletiana* Timb.-Lagr.?" It is clear that Fraser was rather dubious about the name, as his question-mark indicates, and the Antrim specimen from which he took his description is now known not to be Timbal-Lagrave's mint, but corresponds well to Briquet's var. *horridula* of *M. longifolia*. It is not an uncommon mint in Britain, being frequently a garden outcast. Indeed, Still called it the "common horse-mint." Different gatherings show some variation in degree of hairiness, but the very salient serratures provide a character whereby it is easily identified. There is one interesting difference between British material and the Geneva specimens. Whereas in the former the stamens seem always to be included, in the latter they are included in some specimens and exserted in others.

Additional notes on this mint are to be found in *B.E.C. Report* for 1926 (p. 271) and for 1935 (p. 183).

THE HABITATS AND DISTRIBUTION OF GENTIANA ULIGINOSA WILLD.

By J. E. Lousley.

This species was first accurately recorded from Britain by the late H. W. Pugsley in 1924 from near Tenby, and his account includes an excellent description of the plant. In 1948 two additional records were published from the Gower Peninsula (Lousley, 1948; Wallace, 1948) but all others seem to be definite errors or doubtful (see below). Very few botanists had seen the plant growing in Britain and little was known of its habitats. I therefore arranged a visit to South Wales in the company of D. McClintock in August and September 1948 with a view to obtaining more information, and the following notes embody our observations.

Gentiana uliginosa has been recorded from Britain as follows:—

V.-c. 45, Pembrokeshire; damp sandy pasture near Tenby, Pugsley (1924). After a lengthy search based on hints from the late Mr Pugsley, it was seen here in one small dune slack in which the dominant species was *Salix repens* (*sensu lato*). Other closely associated plants were *Linum catharticum* L., *Rubus caesius* L., *Hydrocotyle vulgaris* L., *Anagallis tenella* Murr., *Samolus Valerandi* L., *Mentha aquatica* L., *Prunella vulgaris* L., *Epipactis palustris* (L.) Crantz, and *Juncus acutus* L. (one clump). The habitat was clearly very damp, and the gentian grew in dense vegetation. No *G. axillaris* (F. W. Schmidt) Rchb.* was observed in the immediate vicinity and only 8 plants of the rarity were seen, although owing to the extreme difficulty of detecting them there may have been others in younger condition. No really similar habitat was noticed during a long search and observations by J. E. Arnett following Pugsley's discovery suggest that it may be restricted to a single spot where it varies considerably in quantity from year to year. The present dense vegetation in the slack must be a handicap to its growth.

[V.-c. 44, Carmarthen; in this county there are large stretches of coastal dunes which are likely to offer suitable habitats for the species. We searched the coast near Pembrey unsuccessfully but in view of the known distribution further investigation is desirable.]

V.-c. 41, Glamorgan; the history of the two records for this county is as follows:—

*This name is used here in place of *G. Amarella* L. for the reasons given by Pugsley (1936, *J. Bot.*, **74**, 165).

(a) Fresh material of a gentian was sent to me in August 1927 by Miss Violet Peel for identification and as they proved puzzling, the specimens were preserved in my herbarium. In December 1946 I realised that they were *G. uliginosa* and obtained Pugsley's confirmation. The specimens were vaguely localised as "Gower Peninsula" (Lousley, 1948) but fortunately Miss Peel had passed on my comments to Miss Vachell, together with certain information about where she had found the plant. We made two visits to the dunes at Oxwich and eventually found the gentian at a spot which agreed closely with her description of 20 years earlier. The habitat was an apparently dry dune slope with little vegetation except a few fronds of *Pteridium aquilinum* (L.) Kuhn extending up the slope from denser growth below, and a few tufts of *Festuca ovina* L. It differed conspicuously from the Tenby habitat and in a place less than 100 yards away which, from our previous experience, we regarded as obviously suitable, no trace of the plant could be found. About 60 plants were seen at Oxwich.

(b) In 1934 the late A. L. Still collected specimens from Llanmadoc, Gower, which remained unrecognised in E. C. Wallace's herbarium until about the end of 1946 (Wallace, 1948). It happened that the writer was aware of the route taken by Still on his visit to Llanmadoc and after several hours spent searching the dunes the plant was found by Miss E. Vachell who accompanied us on this part of our trip. The habitat here was much more like the one at Tenby though slightly drier. *Salix repens* was abundant. It was clear that *G. uliginosa* did not favour the lowest and dampest ground. The colony included at least 30 plants. The interesting feature of this locality was the abundance of *G. axillaris* which even grew mixed with *G. uliginosa* but was distinguishable at a glance by the stouter habit and shorter peduncles as well as the characters of the cotyledons, branching, leaf-shape, and calyx segments. In addition there was a slender form of *G. axillaris* in wetter places which somewhat simulated *G. uliginosa* in general appearance but was easily separated by the characters given above.

Thus in all three known British localities *G. uliginosa* is in very small quantity, apparently restricted to an extremely limited area (about 8 square yards in each case), and grows in dune slacks, though its water requirements vary.

The erroneous or doubtful British records are as follows:—

[V.-c. 57, Derbyshire (Smith). 65, N.-W. York; Richmond (leg. ?). 90, Forfar; Arbroath (leg. ?). Given for these three counties (as stated) by Wettstein, but there is no further evidence of its occurrence there.]

[V.-c. 96, Nairn; a short mile east of Nairn, 1899, Marshall (2171). Pugsley (1924) pointed out that specimens of this gathering in Herb. Mus. Brit. are an annual form of the *Campestris* group and not of the *Amarella* group to which *G. uliginosa* belongs.]

[V.-c. 107, E. Sutherland; Golspie, 1913, G. C. Druce, teste Lindman. The two specimens on the sheet of this gathering in Herb. Druce are *G. septentrionalis* Druce. Nyman (1881) includes Scotland in the distribution of the species and this record, together with Marshall's erroneous one from Nairn, was repeated by Trail (1906).]

The distribution in *Comital Flora* should be corrected to:—41, 45. [57, 65, 90 doubtful; 96, 107 errors.]

The headquarters of *G. uliginosa* are North Germany from the Friesian Islands to East Prussia. Here the plant occurs in the form illustrated in Reichenbach (1823) and by Wettstein (1896), which agrees closely with our specimens from South Wales. It extends south to Silesia, Bohemia, Moravia and Thuringia. To the north the species is found in Denmark, south Sweden and Norway, but in the latter country as illustrated by Lid (1944), and in Sweden, to judge from herbarium material, it is represented by a plant of very different habit. In recent years it has been recorded from almost the whole length of the Dutch coast (Sloff, 1942) and there probably agrees with the typical North German material (cf. Heukels, 1925, t. 110, 9, as *G. Amarella*). There are records for France and Belgium, but I have seen no specimens.

The known British distribution is not at all what one would expect from this. The occurrence of the species on the east coast of England (or perhaps Scotland) would fit in with its European range and the plant should be searched for in likely habitats. In this connection it should be noticed that although many of its foreign localities are in slacks of coastal dunes it is not restricted to such places but is also found in damp meadows and other spots where conditions are wetter than in the usual habitats of *G. axillaris*. The South Wales localities are outliers as also are the French (if the plant from them is correctly named). But until further British stations of a different kind are discovered the entry "Moist grassy places" in *Comital Flora* should be corrected to "Dune slacks."

The relationship of the annual *G. uliginosa* to the over-wintering *G. axillaris* has been compared by Murbeck and others to that between *G. baltica* and *G. campestris*. The comparison cannot be applied here as much of the British "*G. baltica*" is merely a short-lived annual state of *G. campestris* which is not identical with the *G. baltica* of northern Europe. It can, however, be said from observations in South Wales that *G. uliginosa* is unlikely to be a mere annual state of *G. axillaris*. The characters hold good even when the plants grow intermixed—as at Llanmadoc. There, as at Kenfig, there were large areas where *G. axillaris* abounded in dune slacks favourable to production of annual states

where no *G. uliginosa* could be found. The conclusion suggested by our observations is that the latter is a good species and is quite easily distinguished by the characters given by Pugsley.

The material on which this note is based was exhibited at the meeting of the Society on October 29, 1948.

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THE KENFIG EPIPACTIS

By Charles Thomas.

In December 1941 I published a paper in the *Journal of Botany* in which I described the newly-detected *Epipactis pendula* C. Thomas. To my drawing illustrating this article I added a sketch of an *Epipactis* found on the Burrows at Kenfig, Glamorganshire. I then expressed the opinion that this plant was closely related to *E. pendula*, and deserving of further study.

Further visits to Kenfig in recent years, and the kind help of the late Miss E. Vachell, enable me to give a much more correct and complete account of the Kenfig *Epipactis* and its past history, which is not nearly so simple as I had at first imagined.

The Kenfig Burrows, famous to botanists as a locality for *Liparis Loeselii* var. *ovata*, and other rare and interesting plants, are very rich in Orchid species. *Epipactis palustris* is particularly abundant, and its variety *ochroleuca* occurs in quantity in good years. It was while examining this variety, in July 1941, that I chanced upon two strange plants growing well up the steep side of a sand heap, in a thick tangle of *Salix repens*. A casual observer might have passed them by as two more victims of the local rabbits, who are fond of nibbling at the flowering spikes of *E. palustris*; but the unusual situation prompted me to examine them closely. Not only were they a form of *Epipactis* differing from any I had previously encountered, but my interest was further aroused by the ease with which I located several other specimens in similar situations. I have since established the fact that the plant is widespread on the Kenfig Burrows. It occurs, in much smaller quantity, on the adjacent Margam Burrows. I have not, as yet, found it elsewhere.

The past history of the Kenfig *Epipactis*, for which my name *Epipactis cambrensis* seems to meet with general approval, is complicated by recent discoveries. It is now apparent that other species of *Epipactis* grow on the Burrows, beside those already mentioned. The full list is, at present:

1. *Epipactis palustris* Crantz, and its variety *ochroleuca* Barla.
2. *Epipactis Helleborine* (L.) Crantz.
3. *Epipactis pendula* C. Thomas.
4. A small *Epipactis* closely resembling *E. dunensis* (T. & T. A. Steph.) Godfery in appearance.
5. *Epipactis cambrensis* C. Thomas.

Of these, No. 1, *Epipactis palustris* with its variety is abundant on the damper slacks amongst the dunes. No. 2, *Epipactis Helleborine* occurs in rather dry sand almost destitute of *Salix repens*, in full sun-

light. In spite of this exposed situation, the plants are of a characteristic deep green colour, and the flowers are a dark, dull purple. From past experience, I should have expected these plants to be well "bleached out" by the strong sunlight. The only concession to the unusual habitat is, that the flowers all turn their backs to the midday sun. No. 3, *Epipactis pendula* occurs in a thick growth of *Salix repens* and *Rubus caesius*. The plants are small compared with the Lancashire examples, but the inflorescence is absolutely typical.

A single specimen of No. 4 was taken to the Kew Herbarium this year (1949) to be suitably preserved. It is a small plant which, when found, was in bud. It was left to flower and visited again a week later. The day was very stormy, but two flowers were then open. They bore a remarkable resemblance to those of *E. dunensis* in both form and colour, but differed in having a well-developed rostellum, large for the size of the flower. On the following day, which was hot and sunny, both flowers had been visited by insects and the pollinia removed. It is hoped to devote more time to this *Epipactis* next season.

The main object of this paper, *Epipactis cambrensis*, is now to be dealt with, the formal description being followed by a more detailed account, with comments.

Epipactis cambrensis C. Thomas, sp. nov.; *E. dunensi* (T. & T. A. Steph.) Godfery similis, sed statura minore et habitu debili, radicibus robustis et numerosis, foliis fortiter plicatis, marginibus ciliatis, floribus parvis pallidis pendentioribus, ovario longo compresso, praesertim labelli hypochilio intus haud colorato facile distinguitur.

Herba parva, debilis, glabra, c. 10-25 cm. (rarius 35 cm.) alta, luteoviridis. *Caudex* in arenosis, inter *Salicem repentem*, sabulo movente profunde obrutus; rhizoma circiter 15-20 cm. longum, radices numerosas carnosas 9-10 cm. longas bilateraliter emittens. *Caulis* proprius solitarius, saepius dimidio inferiore vel ultra subterraneus; parte subterranea basali radices, alias brevissimas, alias c. 14-15 cm. longas per paria emittens; superne c. 6-8-foliatus, in inflorescentiam terminans. *Folia* oblongo-lanceolata, fortiter plicata, sectione ± V-formia, inferiora latiora et breviora (usque ad 3.5 cm. lata), superiora angustiora et longiora (usque ad 7 cm. longa), suprema in bracteas abeuntia, crassiuscula, tactui sicca, marginibus ciliatis. *Racemus* laxus, usque ad 10-florus; bracteae lineari-lanceolatae, inferiores floribus longiores, superiores breviores. Flores parvi (c. 10-15 mm. lati), aliquid pendentes; ovarium immaturum longum, c. 21 mm. longum (cum pedicello), angustum, dorsiventaliter compressum, maturum valde inflatum. *Sepala* et *petala* saepe acuminata, sepala 10.5 mm., petala 9 mm. longa, 5 mm. lata, luteo-alba. *Labellum* 7.5 mm. longum, bene formatum, album: epichilium cordatum, 4.5 mm. longum, reflexum; calli bini prominentes, albi; hypochilium orbiculare, 3 mm., intus haud coloratum. *Columna* 4 mm. longa; anthera sessilis, aliquid impendens; rostellum rudimentarium; pollinia in alabastro friantur et pollen in stigma extruditur.

Wales; v.-c. 41, Glamorgan; Kenfig Burrows, *C. Thomas*, July 19th, 1941; July 18th, 1942 (type), etc. Type in British Museum (Natural History).

Epipactis cambrensis is a small, apparently delicate, plant, a sickly yellow-green in colour, from 10 to 24 cm. in height (up to 35 cm. exceptionally). It grows on the sides and summits of well-drained sand heaps, in a thick growth of *Salix repens*. It is often irregularly blotched with patches of dark brown, due perhaps to the scorching action of the sea air.

The roots descend very deeply into the sand. There is, in fact, more of the stem below ground than above. It is quite useless, in most cases, to attempt to extricate the plants from the tangle of roots and underground stems of *Salix repens* through which they grow. By a lucky selection one, possibly of more recent origin, was extracted almost undamaged. Further investigation of the underground portion of the plant was abandoned when it was found that the almost certain result would be the pointless destruction of a rarity. Nothing was observed, however, to suggest that the deepest rooted specimens differed in any essential particular from the plant here described. (This plant is illustrated in the accompanying fig. A., and has been designated as the type).

The rootstock consists of a short rhizome 15-20 mm. in length, which throws off a dense cluster of long fleshy roots, having a decidedly bilateral arrangement. As a result of the accumulation of sand, due to drift, the rhizome becomes very deeply buried in the course of years. The plant illustrated had a stem 53 cm. in length: 30 cm. below ground and 23 cm. above. In most cases, the length of the underground portion of the stem greatly exceeds the figure shown. On the other hand, the aerial stem varies within much narrower limits. The internodes of the rising stem are first short, alternate ones giving off, first two sets of very short rootlets; then two unusually long roots from opposite sides of the stem, descending steeply to a length of about 15 cm.; half as long again as the longest roots issuing from the rhizome itself.

As the plant nears the surface of the sand, the internodes increase greatly in length; at about ground level, they are clasped by purple-tinted sheaths characteristic of *Epipactis*. The internodes shorten again as the leaves are produced. The leaves alternate on opposite sides of the stem, clasping it at their bases. They are simple, ciliate edged, rather oblong-lanceolate; but appearing very slender because they are sharply folded upwards on the midrib, to avoid excessive evaporation. A cut across the centre of the leaf gives a pronounced V-section.

The following measurements are the actual size of the leaves of one plant, taken from below upwards: 3 × 3½ cm., 3½ × 5½, 3 × 6, 2½ × 7, 1½ × 7 and 13 mm. × 6½ cm. Beyond this the leaves pass into the linear-lanceolate bracts accompanying the flowers. The bi-lateral arrangement of the parts, mentioned in connection with the root, is a consistently characteristic feature of the whole plant.

The flowering spike is few flowered and lax. Robust plants bear about 10 flowers. The lowest bracts are longer than the flowers, diminishing to shorter than the flowers at the apex. The pedicel is curved down, but less so than in *E. pendula* or *E. vectensis* (T. & T. A. Steph.) Brooke & Rose, so that the flowers do not appear to hang loosely but tend rather to give the whole plant a somewhat sinuous aspect. The ovary is remarkably long and narrow, smooth, and flattened above and below: a feature which should distinguish it at once from any other British *Epipactis* when in flower. The flowers are small and yellowish-white in colour. The interior of the hypochile of the lip, which is small but well-formed, is uncoloured. A narrow slit, running between the two basal bosses of the epichile, has sometimes a faint purple tint. The epichile itself is almost pure white.

The flowers are self-pollinated, and as pollination appears to take place in the bud, insect pollination is extremely unlikely. The rudimentary rostellum does not respond to an artificial stimulus: it performs its original function as part of the stigma.

Although *Epipactis cambrensis* superficially resembles *E. dunensis* it is not nearly related to that species, being distinguished, with *E. pendula* and *E. vectensis*, by the complete absence of colour (deep purple to crimson) in the hypochile of the lip. The resemblance of the habitat of the two species is of no significance, since even that is superficial also.

Griffith (1895) gives the following record: "*Epipactis latifolia*. Native, in damp woody places, and in damp sandy places." The *Epipactis* of the " damp sandy places " must at least include *E. dunensis* (first described under the name *Helleborine viridiflora* by Wheldon and Travis, 1913). I have not seen the Anglesey plants, or the locality, but in Lancashire I have found the slacks inhabited by *E. dunensis* waterlogged in a wet season. On the other hand, the Kenfig Burrows are remarkably well-drained. In very wet weather, I have found them quite dry even near to Kenfig Pool. The rain is absorbed into the sand as it falls. Moreover, *Epipactis cambrensis* grows on more or less raised, and consequently dry, sand heaps fixed by *Salix repens*. This difference of habitat is evidently of great importance in the life-histories of the two plants. Whereas *E. dunensis* has an extremely feeble root-system, and is often attacked by disease some distance below ground, so that the above-ground plant has no living connection with its underground root, *Epipactis cambrensis* in its drier habitat, has an extremely vigorous root-system, even sending down roots from the underground stem to assist in obtaining the requisite moisture from the well-drained sand.

The late Miss E. Vachell informed me that " when a child " she was shown the Kenfig *Epipactis* by her father, Dr C. T. Vachell, but was never able to find it again herself.

Riddelsdell (1907) gives the following record: " *Epipactis Helleborine* Crantz. . . . Aberafan and Kenfig Burrows, Whitehouse." This record is copied by Trow (1910) and credited to Ridd. [Riddelsdell] under *Epipactis latifolia* All. In view of the fact that *Epipactis Helleborine* is now known to grow on the Kenfig Burrows, it is impossible to say if this record can be held to indicate *Epipactis cambrensis*. It is clear that neither Riddelsdell nor Trow saw the plants themselves.

Vachell (1933) makes no mention of the Kenfig *Epipactis*. Nor is there any mention of Kenfig as a locality for *Epipactis* (other than *E. palustris*) in Hyde and Wade (1934).

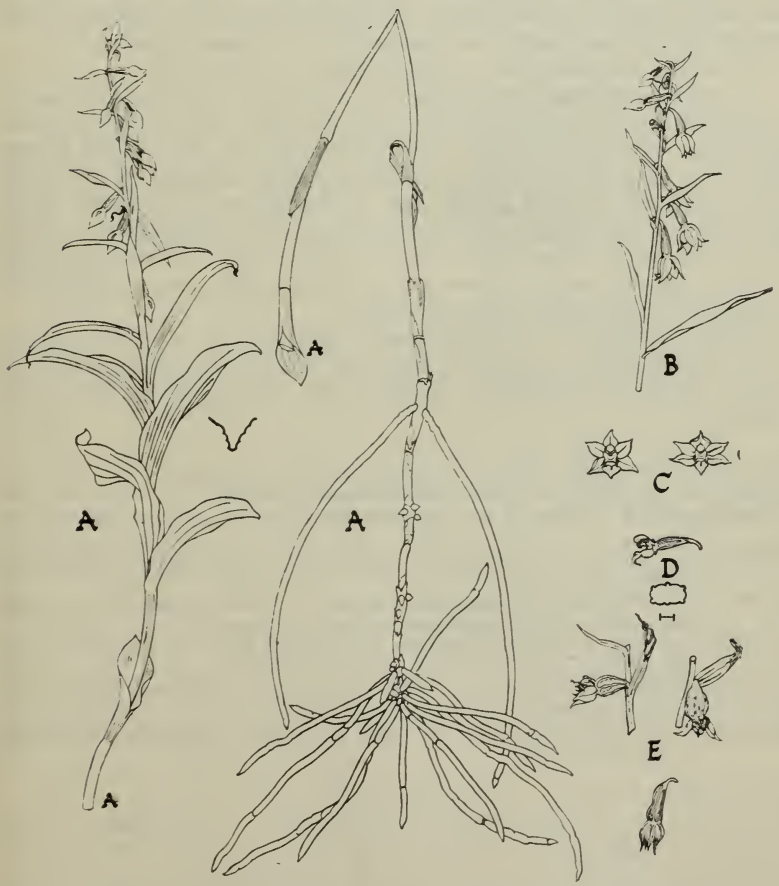

Fig. 1. Drawn by the author from fresh specimens, 18th July 1942. AA—Complete plant, in bud ($\times\frac{2}{5}$). B—Flowering raceme. C—Two types of flowers. D—Ovary, column and lip in profile, with section of ovary. E—Ripening ovaries.

Vachell (1936) gives: " *Epipactis latifolia* All. Sylvestral. Locally common. Cwrt yr-Ala, Kenfig! . . . Leaves varying considerably in specimens from dunes and from woods, some being much narrower than others." This slight reference to the Kenfig *Epipactis* is the first recognizable printed record.

Miss Vachell informed me that Miss Rawling had sent her " an accurate description " of the plant, but omitted to collect specimens. She also stated that she then had a specimen of the plant in her collection, picked by Miss Thomas. This probably accounts for the appearance of the record in the 1936 list, as opposed to the one of 1933.

In 1940, Mr J. Williams, of Cardiff, rediscovered the *Epipactis* and took specimens to the Herbarium of the National Museum of Wales—the first to reach the collection. With the help of Mr Williams, Miss Vachell visited the locality and again saw the plant growing.

I first found specimens, as stated above, in July 1941.

It might be assumed that *Epipactis cambrensis* is more rare than is actually the case, from the above scanty records. In 1949 it was quite reasonably common, although by no means easy to find, on the Kenfig Burrows. It is an insignificant plant, largely concealed by the *Salix repens* amongst which it grows; but anyone having a knowledge of its habit, and a reasonable amount of perseverance, should have no difficulty in locating, over a wide area, a considerable number of plants. As there are no trees at present on the Kenfig Burrows, a shade form of *Epipactis cambrensis* does not occur.

Acknowledgments and thanks are due to Mr Victor S. Summerhayes, of the Royal Botanic Gardens, Kew, for reading the manuscript and making valuable suggestions, particularly in regard to the Latin diagnosis.

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RUBUS CORYLIFOLIUS var. PURPUREUS Bab.

By W. C. R. Watson.

There is a bramble widely distributed in England that agrees well with Babington's (1869) description under the above name. I have studied it in the field in Middlesex (Finchley Common), West Kent (Whitehorse Wood, Luddesdown) and S. Wilts. (Southleigh Wood).

After his description Babington quotes *R. Wahlbergii* Arrh. and *R. thamnocharis* Müll. as synonyms, but these do not really agree with his plant. His herbarium also contains specimens sent by correspondents which are labelled *R. corylifolius* var. *purpureus* or *R. fasciculatus* P. J. Muell., some of which are *R. conjungens* and other species.

Babington later adopted the name *R. fasciculatus* P. J. Muell. in the belief that it fitted his own plant. "*R. fasciculatus*" was then taken up by Rogers (1893; 1900; 1908), Riddelsdell (1925) and Druce (1928). As I stated (1928, 170) this identification is erroneous, and I have used Babington's earlier name *R. corylifolius* var. *purpureus* for the plant.

Rogers (1900, 95) says: "I know very little of this as a living plant," and then gives a description based on specimens collected by Bagnall, which were issued in Set of British Rubi, No. 50. He states that the plant seems too glandular and aciculate for close alliance with *R. corylifolius*. In Babington's herbarium there is a manuscript note by Rogers, dated 1911, in which he states that Babington's plant is certainly distinct from the form described in the *Handbook*, and adds that the specimens furnished by Bagnall had been confirmed by Babington. Rogers' (1900) description in the *Handbook* and the "Set" specimens are of the bramble that Babington (1869, 274) describes under the name "*R. althaeifolius* Host," and that stands as *R. Babingtonianus* W. Wats. in Watson (1946). I have been acquainted with this bramble for many years, both in stations close at hand in W. Kent and Surrey, and further afield in Cambridgeshire, Suffolk, Norfolk and Yorkshire; I have received it also from the Hebrides and Ireland. The specimens in Babington's herbarium are mixed, but his descriptions (1869, 274-6; 1881, 109) well define the plant intended, and must, I judge, have been composed from the living plant.

The case is similar with *R. corylifolius* var. *purpureus*. Rogers says, in Herb. Babington, "I do not understand Babington's *R. fasciculatus* (*R. corylifolius* var. *purpureus* Bab. prius) . . . Babington's herbarium specimens (nos. 391, 398, 400, 401, etc.) seem almost without exception to be of hybrid origin—apparently *R. corylifolius* × *rusticanus*."

Objection cannot well be taken to any suggestion of this or that Corylifolian being of hybrid origin, since there is no doubt that they

all derive from crosses between *R. caesius* and a Morifer—with one possible exception where *R. idaeus* and not *R. caesius* may be concerned—but one would not agree that this disposes straightaway of any claim they may have to a separate name as a species; and the suggested origin from two eglandular species hardly seems probable for a bramble with a slightly glandular and aciculate stem and a more decidedly glandular and aciculate panicle.

A sufficient field knowledge of the brambles concerned brought to the study of Babington's full and accurate descriptions—not to the specimens in his herbarium which are probably incomplete in number—should lead to the recognition that both are good species.

Rubus purpureicaulis sp. nov. Syn.: *R. corylifolius* var. *purpureus* Bab., 1869, *British Rubi*, 267-268. Exclude synonyms.

BABINGTON, C. C., 1869, *The British Rubi*, 267-268, 274-279.
——, 1881, *Manual of British Botany*, Ed. 8, 109 [reprinted in later editions].
DRUCE, G. C., 1928, *British Plant List*, Ed. 2, 35.
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——, 1900, *Handbook of British Rubi*, 95.
——, 1908, Rubus, in HANBURY, F. J., *London Catalogue of British Plants*, Ed. 10, 15.
WATSON, W. C. R., 1928, Minute Stellate Hairs on the Upper Face of Bramble-Leaves, *J. Bot.*, **66**, 169-170.
——, 1946, Rubus, in CLAPHAM, A. R., Check List of British Vascular Plants, *J. Ecol.*, **33**, 337-344.

THE HABITAT OF CUSCUTA EUROPAEA L. IN BRITAIN

By Bernard Verdcourt.

Except in certain restricted areas *Cuscuta europaea* is not a very well-known plant in this country. I have briefly commented on its typical habitat (Verdcourt, 1948) and these notes are an expanded account of this subject. Three factors at least seem to be necessary in order to make a habitat suitable for this species, and these will be dealt with separately.

1. *Presence of Water.* The species shows a marked preference for the banks of running water, and this fact is sometimes mentioned in local Floras (e.g., Druce, 1886; 1897). I have studied the plant in six widely separated loci and in each case it has been growing within a yard of the water. Four of these six loci are situated on the banks of large rivers, one on the bank of a small stream and the other on the bank of a very small streamlet. In order to confirm this preference for the nearness of water as many herbarium specimens as possible were examined. For some of these, precise locality data were available, but in other cases the label gave only the name of a town or district (as is so often the case). In such cases as these the name was traced on a map and the features of the district ascertained. This analysis is very speculative but the results are significant. Of the 115 records which were investigated 95 were from places where there are large rivers, 14 where there are large streams, 3 no information available, and 3 from places where there is no running water. It is also significant that the last three records are all of plants with cultivated *Vicia* sp. as host and it is therefore likely that the dodder was introduced in these cases. The proximity of running water is not in any way essential for germination, but humid conditions are necessary for the development of the seedling and for its attachment to the host plant. Though the reason for this preference for the nearness of water is obscure there is no doubt that it is very real. The banks of rivers are often composed of nitrogen-rich soils, particularly if dredging has been carried out. The plant and its preferred host favour such soils and dredging activities frequently result in an increase in the amount of dodder. Water stimulates growth, and the following example of the action of flooding was observed in a scrub by the R. Ouse at Stevington, Beds. There has been a well-established patch of dodder in this locality for several years, and on 17th August 1946 a small patch which had obviously resulted from a single seedling was found some twenty yards further upstream from the main patch. This small patch was only a few inches from the river and was in full flower, nettles being the only host. When revisited on 20th September 1946 the water had risen and was covering

the plant to a certain extent. Vigorous new growth had taken place and many shoots bearing what seemed to be cleistogamous flowers had made their appearance. The flowers on the main stem had died and ripe fruits were present. The new shoots had attached themselves to thistles and grasses. Laboratory work as well as field work will be necessary to elucidate the relation of this species to water. I am not certain whether this preference is marked throughout the wide range of the plant, but one frequently notices that the presence of water is noted on the labels attached to herbarium specimens from other countries. The preference for a riparian environment naturally influences the altitudinal distribution and, as I (1948) have stated, *C. europaea* in Britain grows at altitudes ranging from 0-150 ft. (by rivers and streams) and more rarely in localities at heights ranging from 150-400 ft. These latter localities are as would be expected mostly the banks of streams.

2. *Shade*. There is a little evidence to show that shade is a necessary factor. I have only found the plant in the shade of bridges, hedges, or dense herbage. Physiological experiments support these observations. Direct light retards elongation of the seedling and diffuse illumination favours its healthy development.

3. *Host-plant*. Many works, particularly continental ones, indicate that practically any plant is suitable as a host, but in this country at any rate, and probably in Europe also, *Urtica dioica* L. is the most important host. Linnaeus' herbarium specimen was found on nettle and Gerard (1597) gave the host as nettles. A good deal of erroneous host information has resulted through the misidentification of the dodder concerned (even by many botanists who should have known better!). Numerous records of *C. europaea* from gorse, bracken and other typical heathland plants are, when the plant on which the record was based is examined, found to be referable to *C. epithymum* (L.) Murr. Numerous alien dodders have been wrongly identified as *C. europaea* and this has resulted in further erroneous host information. In the analysis which is included in this section, all the specimens were critically examined microscopically. In the six loci studied by the writer, *Urtica dioica* has been the main host, though in one, *Humulus Lupulus* was as much parasitised as the nettles. J. E. Lousley states (*in litt.*) "on all the occasions when I have seen this plant it has been clear that *U. dioica* was the primary and perhaps the only true host."

This fragmentary personal knowledge was supplemented by a survey of herbarium and other records. In all cases where the plant preserved with the parasite was not *Urtica* it is impossible, in the absence of full data, to state whether or not the latter was present. Owing to the rarity of the plant only 102 occurrences were investigated.

Data concerning the association of *C. europaea* with the common nettle are summarised in Table 1. Even if we assume that, in the 32 cases where nettles are not preserved with the dodder, they were not

present in the locality, then the results are still significantly in favour of the hypothesis that *C. europaea* and *U. dioica* are in some way related.

Table 1.

Association of *C. europaea* with *Urtica dioica*.

	Nettles as host	Nettles absent	Host some other plant and no information as to the presence of nettle	No host information
Number out of 102	62	2	32	6

Several authors state that *Humulus Lupulus* L. is a frequent host, and data concerning the association with hops in the same sample of 102 occurrences are given in Table 2.

Table 2.

Association of *C. europaea* with *Humulus Lupulus*.

	Hop present and nettle absent	Hop and nettle present	No information as to presence of hop	Hop present but no information as to presence of nettles	No host information
Number out of 102	2	6	73	15	6

In view of the fact that no other plant is preserved as host more than five times in the sample these 23 occurrences on hop indicate that it is an important host and it is interesting to note that hop and nettles are closely related phylogenetically. J. D. Grose states (*in litt.*) that he has found *C. europaea* growing in a hedge at Burpham Court, Surrey, and that the host appeared to be solely the hop. A note appended to a specimen collected by J. E. Little at Somerton, W. Suffolk, states that the original host was hop but that the parasite had spread later to other plants. It has been assumed that nettles were not present as a host in these two instances.

In pot experiments, seedlings of *C. europaea* take equally well on a wide variety of plants, even onions and grasses, and it is difficult to account for so definite an association with nettles. Possibly the only explanation is that the two plants like the same kind of habitat. Nettles prefer a soil rich in nitrogen and for this nitrification a pH of 5-7 and ample moisture are needed. Such conditions frequently obtain in riparian habitats. This hardly seems sufficient to explain the association and there is doubtless a physiological cause.

Once the dodder has taken on nettles it will spread on to a wide variety of plants. It would serve no useful purpose to give a complete list of all the hosts which have been recorded the most important are given in the lists of sample communities (below). Although chiefly con-

fined to herbaceous plants, it will successfully parasitise shrubs and even trees, e.g., *Acer campestre* L., *Crataegus monogyna* Jacq., and *Prunus spinosa* L. White (1912), reporting the species along the bank of the R. Avon near Bristol, states that the chief host was the nettle, but that the dodder occasionally got into overhanging willows. It is frequently found twining round a part of itself and haustoria are sometimes inserted. The samples that follow show the type of communities favoured by the parasite and the plants listed are believed to be true hosts (i.e., ones from which nourishment is being drawn and not merely acting as supports). This has been ascertained in doubtful cases by section cutting. All these communities were more or less closed, in the normal sense of the word. From the point of view of the parasite, however, once it has become firmly affixed to the host, all communities are open.

Sample Communities.

1. On the bank of a small stream bordering a fallow field at Leighton Buzzard, Bedfordshire. Since 1943 nettles have very greatly increased in this locality. The dodder has been observed to start on the nettle each year that the locality has been visited, and has then subsequently spread to other plants including *Calystegia sepium* (L.) R. Br., *Glyceria maxima* (Hartm.) Holmb. and *Equisetum arvense* L.

2. On the banks of the R. Loddon at Wargrave, Berks. These are covered with mud and débris dredged from the river. The dodder is restricted to the riparian community and does not extend to the masses of *Polygonum* spp. which occur just behind it. The riparian community includes the following parasitised plants:—*Epilobium hirsutum* L., *Cirsium* spp., *Atriplex* sp. and *Urtica dioica* L.

3. On the bank of a very small streamlet at Sonning, Oxon., spreading to a nearby hedge. Nettles were the sole host on the bank, but in the hedge the following were parasitised:—*Rubus* sp., *Crataegus monogyna* Jacq., *Heracleum Sphondylium* L., *Galium Aparine* L., *Humulus Lupulus* L., *Urtica dioica* L. and various grasses not in flower. The dodder was also twining on ivy but no haustoria had penetrated.

4. By the R. Ouse at Harrold, Beds. *Urtica dioica* only.

5. By the R. Ouse at Milton Ernest, Beds. (J. G. Dony). *Urtica dioica* L. was the chief host, also *Angelica sylvestris* L., *Galium Aparine* L., *Achillea Ptarmica* L., *Cirsium vulgare* (Savi) Ten., *C. arvense* (L.) Scop., and *Solanum Dulcamara* L., but it had not spread to the grasses or sedges.

6. By the R. Ouse at Stevington, Beds. Chiefly on nettles but later spreading to *Cirsium arvense* (L.) Scop. and grasses.

7. By the R. Avon at Bath, Somerset. *Conium maculatum* L. appeared to be the plant most parasitised, together with *Brassica nigra* (L.) Koch, *Eupatorium cannabinum* L., *Urtica dioica* L., and occasionally *Cardamine flexuosa* With. and *Cornus sanguinea* L.

8. Banks of the R. Avon from Bathford to Bristol (Murray, 1896). Chief host was *Urtica dioica* L., also *Brassica nigra* (L.) Koch, *Conium maculatum* L., *Epilobium hirsutum* L., *Galium Mollugo* L., *Carduus crispus* L., *Cirsium arvense* (L.) Scop., *Solanum Dulcamara* L., *Glechoma hederacea* L., and *Sparganium erectum* L.

A study of herbarium specimens has shown that nettles are a common host of *C. europaea* on the continent, but it would be very interesting to have host preference data from throughout the plant's range. Possibly climate, etc., affect this preference, and there may exist races preferring other hosts.

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NOTES ON THE FLORA OF KENSINGTON GARDENS AND HYDE PARK

By Douglas H. Kent.

In 1871 a complete and accurate account of the Flora of Kensington Gardens and Hyde Park was published (*J. Bot.*, **9**, 227-238) by J. B. Leicester Warren, and no less than 190 species were recorded; 25 of these were taken from literature, the rest having actually been seen by Warren. Four years later (*J. Bot.*, **13**, 336) he recorded a further 18 plants from Kensington Gardens.

During the three-quarters of a century which have elapsed the area has seen many changes, two great wars have left their mark, army camps and car parks having been constructed and later abandoned, and various small enclosures turned over to the cultivation of crops. It is only to be expected, therefore, that the greatest decline in the flora must occur in native species, and many of Warren's most interesting plants are no doubt extinct. An increase, however, is to be found among the naturalised aliens and weeds of cultivation, American plants being well represented by *Epilobium adenocaulon*, *Erigeron canadensis*, *Matricaria matricarioides* and *Galinsoga parviflora*, and European ones by *Senecio squalidus* and *Veronica persica*.

The aquatic vegetation of the Serpentine appears to have almost surrendered to the combined efforts of anglers, bathers and boaters, but the various ponds still provide a number of interesting plants.

The following lists of plants were observed during the course of about a score of visits made between the Spring of 1947 and the Autumn of 1949 and is by no means a complete account of the wild vegetation of the area. The geographical situation of Kensington Gardens and Hyde Park makes them an excellent locality for the propagation of adventive species, and in consequence much of the vegetation is continually fluctuating from year to year.

The following abbreviations have been used:—H.—Hyde Park, and K.—Kensington Gardens.

In conclusion, I should like to offer my grateful thanks to Mr J. E. Dandy for his kindness in identifying a species of *Potamogeton*.

6/2. *Ranunculus repens* L. K., on the west side of the Serpentine.
6/3. *R. acris* L. K., by allotments north-east of the Round Pond.
6/33. *R. Ficaria* L. Rare, near Kensington Palace.
35/2. *Rorippa sylvestris* (L.) Besser. H., near the Bowling Green, 1947.
35/4. *R. islandica* (Oeder) Borbás. K., on shingle of a drained lily pond at the head of the Serpentine, 1948.
39/4. *Cardamine flexuosa* With. K., abundant over a small area of turf close to Kensington Palace, 1949.
49/6. *Sisymbrium officinale* (L.) Scop. Common as a flower-bed weed and on disturbed ground.

50/1. *Erysimum cheiranthoides* L. K., on the west bank of the Serpentine, and near the Army Laboratories, 1947.

54/14. *Brassica Kaber* (DC.) Wheeler. Common on disturbed ground.

54/16. *B. juncea* Coss. H., a few plants in a flower bed near the Ranger's Lodge, 1947.

59/1. *Capsella Bursa-pastoris* (L.) Medik. Abundant everywhere.

60/1. *Coronopus didymus* (L.) Sm. K., on a cinder heap near the Army Laboratories, 1947.

60/2. *C. procumbens* Gilib. K., on turf near the Alexandra Gate.

96/2. *Silene Cucubalus* Wibel. K., by allotments north-east of the Round Pond, and on the east bank of the Serpentine.

98/3. *Melandrium album* (Mill.) Garcke. K., a few plants on allotments north-east of the Round Pond, 1947.

98/4. *M. dioicum* (L.) Coss & Germ. H., a few plants in a flower bed near the Ranger's Lodge.

100/5. *Cerastium vulgatum* L. K., on turf south-east of Kensington Palace.

101/3. *Stellaria media* Vill. Common as a flower-bed weed, and on disturbed ground.

102/1. *Arenaria trinervia* L. H., among tall grass near Prince of Wales Gate, 1947.

103/11. *Sagina procumbens* L. K., between the paving stones in front of the Albert Memorial, and in similar situations by the Lily Ponds close to the Bayswater Road.

127/9. *Geranium dissectum* L. K., allotments north-east of the Round Pond, 1948.

142/1. *Acer pseudo-Platanus* L. Many seedlings in flower beds, among rough grass and on waste ground.

153/7. *Medicago lupulina* L. K., a single plant on turf south-east of Kensington Palace, 1947.

154/2. *Melilotus alba* Desr. H., a single large plant in an enclosure near Albert Gate, 1947.

154/3. *M. arvensis* Wallr. H., a few plants in an enclosure close to Knightsbridge Barracks, 1947.

155/2b. *Trifolium pratense* L. var. *sativum* Schreb. Common in enclosures and among rough grass as a relic of cultivation.

155/15. *T. hybridum* L. K., on turf close to Palace Gate.

155/16. *T. repens* L. Abundant on turf, etc.

155/21. *T. dubium* Sibth. H., on turf near Knightsbridge.

164/1. *Robinia Pseudo-Acacia* L. K., a solitary large seedling in a flower bed close to Palace Avenue, 1947.

176/3. *Vicia Cracca* L. H., in a flower bed close to the Police Station, 1947.

176/8. *V. sepium* L. H., in a flower bed near the Ranger's Lodge, 1948.

176/13. *V. angustifolia* (L.) Reichard. H., in an enclosure close to Broad Walk and Marble Arch, 1947.

178/6. *Lathyrus pratensis* L. H., in an enclosure near Albert Gate, 1948.

185/-. *Rubus* sp. K., several small bushes in the enclosure on the east bank of the Serpentine.

189/7. *Potentilla reptans* L. Common as a flower-bed weed.

191/1. *Agrimonia Eupatoria* L. H., three plants among rough grass between Alexandra and Prince of Wales Gates.

194/-. *Rosa* sp. K., several bushes in the enclosure on the east bank of the Serpentine; it is unfortunately not possible to gain admittance to the enclosure in order to ascertain the species, which viewed from a distance appear to be either *R. canina* L. or *R. dumetorum* Thuill.

220/1. *Chamaenerion angustifolium* (L.) Scop. Common on disturbed ground.

220/3. *Epilobium hirsutum* L. H., east bank of the Serpentine.

220/4. *E. parviflorum* Schreb. H., a few plants on disturbed ground near Hyde Park Corner, 1947.

220/7. *E. obscurum* Schreb. Common as a flower-bed weed.
220/7(2). *E. adenocaulon* Hausskn. K., a few plants in a flower bed south of Kensington Palace, 1947.
220/8. *E. roseum* Schreb. H., a single plant in a flower bed near Albert Gate, 1947.
220/10. *E. montanum* L. Frequent as a flower-bed weed.
225/1. *Circaea lutetiana* L. Common as a flower-bed weed.
261/1. *Anthriscus sylvestris* (L.) Hoffm. H., a few plants in a flower bed near Alexandra Gate.
263/1. *Foeniculum vulgare* Mill. H., a solitary large plant in an enclosure near Knightsbridge, 1949.
266/1. *Aethusa Cynapium* L. K., in a shrubbery close to Kensington Palace, 1947.
277/1. *Heracleum Mantegazzianum* Somm. & Lev. K. and H., originally planted on the banks of the Serpentine, but numerous self sown plants are now apparent.
277/2. *H. Sphondylium* L. K., a single plant in the grounds of the Army Laboratories, 1947.
296/11. *Galium Aparine* L. K., in an enclosure south-east of Kensington Palace.
306/1. *Dipsacus fullonum* L. K., a colony of about three dozen plants in the enclosure on the east bank of the Serpentine.
314/1. *Bellis perennis* L. Abundant on turf, etc.
320/3. *Erigeron canadensis* L. Common as a weed of flower beds, and in disturbed ground.
354/1. *Galinsoga parviflora* Cav. K., on allotments west of the Broad Way. 1947. H., Rotten Row, 1947.
354/2. *G. ciliata* (Raf.) Blake. H., a few plants in an enclosure near Knightsbridge, 1949.
365/1. *Achillea Millefolium* L. Common on turf and disturbed ground.
370/13. *Chrysanthemum Parthenium* (L.) Bernh. H., on disturbed ground near The Dell, 1947.
371/1. *Matricaria inodora* L. Common on disturbed ground.
371/2. *M. Chamomilla* L. Common on disturbed ground.
371/3. *M. matricarioides* (Less.) Porter. Frequent on disturbed ground.
378/3. *Artemisia vulgaris* L. H., a few plants in an enclosure near Marble Arch.
379/1. *Tussilago Farfara* L. Common on disturbed ground.
383/7. *Senecio squalidus* L. Frequent on disturbed ground.
383/7×8. ×*S. londinensis* Lousley. H., Rotten Row, 1949.
383/8. *S. viscosus* L. H., Rotten Row.
383/10. *S. vulgaris* L. Common on disturbed ground.
393/3. *Arctium minus* (Hill) Bernh. K., a single plant close to the Army Laboratories, 1947.
396/2. *Cirsium vulgare* (Savi) Ten. K., on the east bank of the Serpentine. H., in an enclosure close to Serpentine Road.
396/8. *C. arvense* (L.) Scop. Frequent on broken ground.
411/1. *Lapsana communis* L. Common as a flower-bed weed, and in disturbed ground.
421/2. *Hypochaeris radicata* L. H., on rough ground near Alexandra Gate. 1947.
422/2. *Leontodon autumnalis* L. K., on turf close to the Lido.
423/1. *Taraxacum vulgare* Schrank. Common on turf.
425/2. *Lactuca Serriola* L. K., a solitary large plant in an enclosure near Kensington Palace, 1948.
427/2. *Sonchus arvensis* L. K., a few plants on allotments west of the Broad Way, 1947.
427/3. *S. asper* Hill. K., on allotments north-east of the Round Pond, 1947.
427/4. *S. oleraceus* L. Very common as a weed of flower beds, and on broken ground.

428/2b. *Tragopogon minor* Mill. H., shrubberies near Alexandra Gate.
511/2. *Calystegia sylvestris* (Willd.) R. & S. K., climbing railings near Kensington Palace, 1947.
517/1. *Solanum Dulcamara* L. K., on allotments north-east of the Round Pond.
517/2. *S. nigrum* L. Frequent as a weed of flower beds, also on disturbed ground.
517/10. *S. tuberosum* L. K., a single plant under a tree, almost in the centre of the gardens and far from allotments.
543/4. *Veronica Chamaedrys* L. H., in an enclosure near Prince of Wales Gate, 1947.
543/18. *V. persica* Poir. K., in an enclosure close to Black Lion Gate, 1947.
577/3. *Stachys sylvatica* L. K., a large patch on the west bank of the Serpentine, close to the road.
588/8. *Plantago lanceolata* L. K., on the east bank of the Serpentine.
588/10. *P. major* L. Abundant on the turf.
600/1. *Chenopodium rubrum* L. K., by the Lily Ponds at the head of the Serpentine, 1949.
600/8. *C. album* L. Common as a weed of flower beds and on disturbed ground.
600/12. *C. ficifolium* Sm. K., in a flower bed west of the Round Pond, 1947.
606/5. *Atriplex hastata* L. K., on allotments west of the Broad Way.
615/2. *Polygonum Convolvulus* L. Common as a weed of flower beds.
615/6. *P. lapathifolium* L. H., a few plants in Rotten Row, 1947.
615/7. *P. Persicaria* L. Frequent on disturbed ground, and as a flower bed weed.
615/14. *P. aviculare* L. (*sensu lato*). Common on the turf, and in disturbed ground.
618/1. *Rumex Hydrolapathum* Huds. K., on the west shore of the Serpentine; possibly planted for ornamental purposes.
618/3. *R. crispus* L. K., in an enclosure south of the Round Pond.
618/6. *R. obtusifolius* L. Common on disturbed ground.
618/16. *R. Acetosella* L. H., rare, in an enclosure close to Serpentine Road, 1947.
637/1. *Urtica dioica* L. K., under a wall close by Palace Avenue, 1947.
637/2. *U. urens* L. K., a few plants in a shrubbery in Peter Pan's Dell, 1947.
642/-. *Betula* sp. H., enclosure near Park Lane, 1948, a solitary small seedling.
646/1. *Quercus Robur* L. Seedlings are not uncommon in flower beds and disturbed ground.
718/4. *Juncus effusus* L. K., close to the allotments north-east of the Round Pond.
718/5. *J. inflexus* L. K., on shingle of a drained Lily Pond close to Bayswater Road, 1947.
719/6. *Luzula campestris* (L.) DC. K., on turf near the west side of the Serpentine.
737/17. *Potamogeton crispus* L. K., floating in the Round Pond, 1947; Lily Ponds at the head of the Serpentine, 1949.
737/25. *P. pusillus* L. K., Round Pond, 1947, det. *J. E. Dandy*.
737/28. *P. pectinatus* L. K., abundant in Lily Ponds at the head of the Serpentine, 1949.
739/1. *Zannichellia palustris* L. K., Lily Ponds at the head of the Serpentine, 1949.
753/9. *Carex hirta* L. H., a few plants among rough grass close to Knightsbridge, 1949.
753/53. *C. ovalis* Good. K., close to the allotments north-east of the Round Pond, 1947.
770/1. *Alopecurus pratensis* L. Common on the turf.
777/1g. *Phleum nodosum* L. H., in an enclosure close to Serpentine Road, 1947.

780/2(2)b. *Agrostis gigantea* Roth var. *dispar* (Michx.) Philipson. Common on disturbed ground, 1947.
780/3. *A. tenuis* Sibth. Abundant on the turf.
780/6. *A. canina* L. K., on turf north-east of the Round Pond.
791/1. *Deschampsia caespitosa* (L.) Beauv. K., a single large tussock close to the Army Laboratories, 1949.
792/2. *Holcus lanatus* L. H., among rough grass near Hyde Park Corner, 1948.
794/7. *Avena sativa* L. K., in an enclosure close to Black Lion Gate, 1947: on allotments north-east of the Round Pond, and allotments west of the Broad Way, 1947.
795/1. *Arrhenatherum elatius* (L.) J. & C. Presl. K., close by allotments north-east of the Round Pond.
808/2. *Cynosurus cristatus* L. H., on turf near Knightsbridge, 1949.
819/1. *Dactylis glomerata* L. Common on disturbed ground, and on the turf.
824/2. *Poa pratensis* L. K., on turf near Lancaster Gate, 1947.
824/6. *P. trivialis* L. K., near Kensington Palace, 1948.
824/7 *P. nemoralis* L. H., a few plants among rough grass close to Knightsbridge, 1947.
824/14. *P. annua* L. Common on the turf, and on disturbed ground.
827/3. *Bromus sterilis* L. Common on broken ground.
827/19. *B. hordeaceus* L. sec. Holmb. Common on disturbed ground.
827/19(2). *B. lepidus* Holmb. K., enclosure near Queen's Way, 1948
828/1. *Brachypodium sylvaticum* (Huds.) R. & S. H., in an enclosure close to Serpentine Road, 1947.
829/1. *Lolium perenne* L. Abundant on the turf, and in disturbed ground.
829/4. *L. multiflorum* Lam. Frequent on broken ground.
830/4. *Agropyron repens* (L.) Beauv. Abundant on the turf.
831/1. *Secale cereale* L. K., a few plants in an enclosure near Black Lion Gate; a relic of cultivation.
835/1. *Hordeum nodosum* L. K., in an enclosure south-east of Kensington Palace, 1947.
835/2. *H. murinum* L. Abundant on disturbed ground.

A CONTRIBUTION TO THE FLORA OF HUNTINGDONSHIRE

By J. G. Dony.

Huntingdonshire has been much neglected by botanists. The nearest approach to a published County Flora is the list given by G. C. Druce, (1926A, *Victoria County History of Huntingdonshire*, 1). In the same year Druce (1926B) published in the *B.E.C. 1925 Report*, 949, a list of the plants of the county not included in *Topographical Botany* and (1926C) included a list of comparative records in the *Flora of Buckinghamshire*.* It is perhaps fortunate that these accounts preceded by a very short time the *Comital Flora* (Druce, 1932) and one may presume that the Huntingdonshire records given in this work were to the best of Druce's knowledge complete.

Druce made very few visits to the county and, with the exception of W. W. Newbould, A. Fryer, W. R. Linton and E. W. Hunnybun, few competent botanists have paid more than "flying visits."

A search of the *B.E.C. Reports* since 1926 has revealed no records of note for the county, except that of a number of *Epilobia* recorded from Monks' Wood by S. A. Taylor in 1939-40.

In making comparative lists for my proposed Bedfordshire Flora it was evident to me that there were a number of species awaiting record in Huntingdonshire and it was for this purpose that an excursion was organised by the Botanical Society during 1948 (see *Year Book*, 1950). I made three preliminary visits to explore the ground to be covered during the excursion. The first, on 9th of May, was with D. A. Davies and H. B. Souster, when a number of gravel pits in the neighbourhood of Hartford and Buckden were visited. On 5th June, again with Davies and Souster, the country between Holme and Wood Walton Fen was explored and a return made to Holme by crossing Connington Dump. The third visit was made on 14th of August with Souster when we visited Ramsey and a number of streams and drains in the north-east of the county. We returned again to Connington Dump where we were joined by J. E. H. Blackie. In the meantime a very fruitful visit was made to Holme Fen by R. A. Boniface and F. Rose on 22nd May, which was later visited by the Cambridge Natural History Society on 6th June, when a full list of plants was made. R. C. L. Burges, J. E. Lousley and D. McClintock visited several Huntingdonshire localities on 27th June. A number of records have also been sent to me by C. D. Pigott, J. E. H. Blackie and J. L. Gilbert. After the excursion I made only one visit to the county: this was on 9th October, when a Huntingdonshire Flora and Fauna Society was formed—one would like to feel that the interest shown by our society contributed to the desire to form

*By an unfortunate misprint the Huntingdonshire records are attributed to "Hants." in the comparative county lists in this work.

a local society. On this occasion Davies and I paid a short but productive visit to the railway sidings at Huntingdon.

These visits have confirmed the general impression that, apart from Wood Walton and Holme Fens and Monks' Wood, already well known and worked by naturalists, the county is of no special botanical interest. It has little variety of soils; boulder clay deposits, reclaimed fen lands, river gravels and alluvial deposits account for almost all. The aquatic flora is interesting but affords little variety. At the same time it is obvious that a great deal of botanical work needs to be done in the county even in localities apparently well worked. It is fortunate that S. M. Walters, Botany School, Cambridge, is not only the recorder for Huntingdonshire for our own society but that he has consented to become recorder for botany for the newly-formed local society. He will be pleased to receive any records and to know of any members who may find time to visit this much neglected county.

During 1948 a list of species found in the county was made. Copies of this list have been sent to the Department of Botany, British Museum (Natural History) and S. M. Walters. The list given here contains new county records, species which had not been recorded for upwards of 60 years and species previously recorded for only one or two stations. I have been in doubt as to what to exclude from the last category as it would have considerably lengthened the list to include all.

* New County Records of species listed in *Comital Flora*.
† Not native in Huntingdonshire.
|| The first record of a species not in *Comital Flora*.
§ An addition to an annotated copy of *Comital Flora*.
Exc. after a record indicates that it was made during the period of the Society's Excursion.
All records refer to 1948 unless otherwise stated.

6/10 RANUNCULUS SARDOUS Crantz; gravel pit, St Ives, R. P. LIBBEY, Exc.

§*†13/3 DELPHINIUM GAYANUM Wilmott; gravel pit, St Ives, B. WELCH, Exc.; Hartford, Exc.

||†21/1 PAPAVER SOMNIFERUM L.; gravel pit, Connington Dump, J. E. WOODHEAD, and A. H. G. ALSTON, Exc.

35/1(2) NASTURTIUM MICROPHYLLUM (Boenn.) Rchb.; Hartford, A. H. G. ALSTON and A. J. WILMOTT, Exc.

||†35/5 RORIPPA AUSTRIACA (Cr.) Bess; Stibbington, J. L. GILBERT, det. A. J. WILMOTT.

54/14b SINAPIS ARVENSIS L. var. ORIENTALIS L.; near Holme Fen; Monks' Wood, A. J. WILMOTT, Exc.; Connington Dump, A. H. G. ALSTON, Exc.

§*†55/1 DIPLOTAXIS TENUIFOLIA (L.) DC.; Connington Dump, D. A. DAVIES, J. G. DONY and H. B. SOUSTER.

†60/1 CORONOPUS DIDYMUS (L.) Sm.; Connington Dump, L. W. FROST, Exc.

89/1 Polygala serpyllifolia Hose; Wood Walton Fen, J. G. Dony, Exc.; the only previous record is from Holme Fen, 1884, A. Fryer (Druce, 1926A).

†95/1 Saponaria officinalis L.; Connington Dump, R. P. Libbey, Exc.

||†96/16 Silene dichotoma Ehrh.; Connington Dump, L. W. Frost and R. P. Libbey, Exc.

||103/7(2) Sagina filicaulis Jord.; St Ives, R. P. Libbey, Exc.; Huntingdon, J. G. Dony.

§†108/2 Claytonia perfoliata Willd.; Stangate Hill, J. E. H. Blackie. Recorded in Druce (1926A) from Yaxley on the authority of Mrs Bird.

§*127/8 Geranium columbinum L.; Stibbington, 1939, J. L. Gilbert.

§*†133/2 Impatiens capensis Meerburgh; Huntingdon, A. H. G. Alston, Exc.; seen at a number of places on the Ouse and apparently spreading as it has in Bedfordshire in recent years.

§*†136/1 Ilex Aquifolium L.; two bushes in a hedge on Alconbury Hill, probably planted, J. E. H. Blackie.

138/1 Rhamnus Frangula L.; Holme Fen, J. G. Dony, Exc.; last recorded c. 1846 by W. W. Newbould (Druce, 1926A).

§*151/2 Ononis repens L.; Stibbington, 1939, J. L. Gilbert; Connington Dump, J. E. H. Blackie, J. G. Dony and H. B. Souster.

§*†153/5 Medicago arabica (L.) Huds.; railway siding, Huntingdon, D. A. Davies and J. G. Dony.

§*†153/6 M. minima (L.) Bartal. var. recta (Desf.) Burnat; railway siding, Huntingdon, D. A. Davies and J. G. Dony.

||†153/26 M. praecox DC.; railway siding, Huntingdon, D. A. Davies and J. G. Dony.

§†154/4 Melilotus indica (L.) All.; railway siding, Huntingdon, D. A. Davies and J. G. Dony. Previously recorded from Buckden by E. W. Hunnybun, 1902 (Druce, 1926A).

§*155/11 Trifolium striatum L.; Stibbington, 1938, J. L. Gilbert.

155/22 Trifolium filiforme L.; outside Monks' Wood, B. C. M. Morgan and A. J. Wilmott, Exc.; previously recorded from Holme Fen in 1884 by A. Fryer, a record which Druce (1926A) thought needed confirmation.

160/4b Lotus uliginosus Schkuhr var. glaber Bréb.; near Monks' Wood; Hartford, A. J. Wilmott, Exc.

||†165/1 Colutea arborescens L.; Connington Dump, D. A. Davies, J. G. Dony and H. B. Souster.

§*†178/1 LATHYRUS LATIFOLIUS L.; railway embankment between Buckden and Huntingdon, J. G. DONY, Exc.

§*†178/9 L. APHACA L.; roadside, Great Gransden, C. D. PIGOTT.

189/8 POTENTILLA PROCUMBENS Sibth.; Holme Fen, R. A. BONIFACE and F. ROSE.

220/5 EPILOBIUM TETRAGONUM L.; gravel-pit, St Ives; Warboy's Wood, J. G. DONY, Exc., det. G. M. ASH.

220/7 E. OBSCURUM Schreb.; Holme Fen; Wood Walton Fen, J. G DONY, Exc., det. G. M. ASH. There appears to be some doubt as to the validity of previous records for this and *E. tetragonum*.

†220/7(2) E. ADENOCAULON Hausskn.; Monks' Wood, A. J. WILMOTT, Exc.; Wood Walton Fen, J. G. DONY and D. P. YOUNG, Exc., det. G. M. ASH. Previously recorded from Monks' Wood, S. A. Taylor, *B.E.C. 1939-40 Rep.*, 279.

§†223/1 OENOTHERA BIENNIS L.; Connington Dump, L. W. FROST and R. P. LIBBEY, Exc.; previously recorded from Yaxley by R. J. Dix (Druce, 1926A).

§*†223/2 O. LAMARCKIANA Ser.; Connington Dump, A. H. G. ALSTON and B. WELCH, Exc.

†279/1 CORIANDRUM SATIVUM L.; Connington Dump, R. P. LIBBEY, Exc.

†289/1 SYMPHORICARPOS RIVULARIS Suksd.; Bevill's Wood, R. C. L. BURGES, J. E. LOUSLEY and D. MCCLINTOCK. Reported from Stibbington, etc., by J. L. GILBERT and Monks' Wood by J. E. H. BLACKIE.

§*†302/1 KENTRANTHUS RUBER (L.) DC.; Connington Dump; Ramsey, J. G. DONY and H. B. SOUSTER; Buckden, C. L. COLLENETTE, Exc.

§*333/4 INULA CONYZA DC.; Stibbington, 1942, J. L. Gilbert.

†354/1 GALINSOGA PARVIFLORA Cav.; Connington Dump; L. W. FROST, Exc.

§*†383/7 SENECIO SQUALIDUS L.; Woodston, 1947, J. L. GILBERT. Hartford, D. A. DAVIES, J. G. DONY and H. B. SOUSTER; seen also at Connington, St Ives and Buckden.

§*†383/8 S. VISCOSUS L.; Stibbington, 1947, J. L. GILBERT; Connington Dump, D. A. DAVIES, J. G. DONY and H. B. SOUSTER; Hartford, B. WELCH, Exc.

§*†395/3(2) CARDUUS TENUIFLORUS Curt.; Connington Dump, D. A. DAVIES, J. G. DONY and H. B. SOUSTER.

†395/8 C. LEIOPHYLLUS Petrov.; Connington Dump, W. H. DAVIES, J. G. DONY and H. B. SOUSTER.

§*†425/1 LACTUCA VIROSA L.; Stibbington, 1947, J. L. GILBERT.

§*†425/2 L. SERRIOLA L.; Huntingdon, D A. DAVIES, J. G. DONY and H. B. SOUSTER; seen at a number of places.

§*425/4 L. muralis (L.) Fresen.; Huntingdon, J. E. H. Blackie.

428/2 Tragopogon pratensis L.; Stibbington, J. L. Gilbert; Connington Dump, J. E. H. Blackie, J. G. Dony and H. B. Souster. As in Bedfordshire, *T. minor* Mill. is the common Goatsbeard.

478/4 Centaurium pulchellum (Sw.) E. H. L. Krause; Monks' Wood. B. C. M. Morgan, Exc.

506/9 Myosotis collina Hoffm.; railway embankment, north of Huntingdon, D. A. Davies, J. G. Dony and H. B. Souster. Only one previous record, Bluntisham, W. W. Newbould (Druce, 1926A).

†509/1 Echium vulgare L.; Connington Dump, Exc.

†511/2 Calystegia sylvestris (Willd.) Roem. & Schult.; Connington Dump, A. H. G. Alston, Exc.

§†521/1 Atropa Bella-donna L.; stream under railway bank near Connington Dump, L. W. Frost, Exc. Previously recorded from Elton Churchyard, J. F. Pierce and Farcet, Mrs Bird (Druce, 1926A).

527/8 Verbascum nigrum L.; Connington Dump, B. Welch, Exc. Only one previous record, Stibbington, 1925, G. C. Druce (1926A).

532/3 Linaria repens (L.) Mill.; Connington Dump, J. E. H. Blackie, J. G. Dony and H. B. Souster; previously recorded from St Neots, 1908 (Druce, 1926A).

532/3×1 L. repens × vulgaris; Connington Dump, A. H. G. Alston and J. E. Woodhead, Exc.

§541/1 Digitalis purpurea L.; Holme Fen, Cambridge Nat. Hist. Soc. Excursion; Monks' Wood, G. H. Day, Exc.; gravel-pit, Hartford, B. Welch, Exc. The only previous record from Washingley Wood, Mrs Bird, was doubted by Druce (1926A).

543/5 Veronica montana L.; Monks' Wood, Mrs Fjellstedt, Exc. The only previous record of this species is an unlocalised one by W. W. Newbould (Druce 1926A).

569/1 Nepeta Cataria L.; near Huntingdon, J. G. Dony, Exc.; near Holme Fen, Exc.; last record, Brampton, 1901, E. W. Hunnybun (Druce, 1926A).

581/4 Lamium hybridum Vill.; Stibbington, J. L. Gilbert, det. A. J. Wilmott.

†588/11 Plantago Psyllium L.; Connington Dump, J. E. H. Blackie, J. G. Dony and H. B. Souster.

†596/1 Amaranthus caudatus L.; cart-track near Wood Walton, J. G. Dony, Exc.

†600/4 Chenopodium hybridum L.; Stibbington, J. L. Gilbert; gravel-pit, St Ives, B. Welch, Exc. The only previous record for the county was from St Ives by A. Fryer in 1884 (Druce, 1926A).

†600/14 C. Vulvaria L.; Connington Dump, A. H. G. Alston. J. E. Woodhead and B. Welch, Exc.

||†615/32 Polygonum cuspidatum Sieb. & Zucc.; Connington Dump, D. A. Davies, J. G. Dony and H. B. Souster.

§†632/2 Mercurialis annua L.; Connington Dump, B. Welch. Exc.; previously recorded from Yaxley by Mrs Bird (Druce, 1926A).

719/5 Luzula pallescens (Wahlenb.) Bess.; Holme Fen, Cambridge Nat. Hist. Soc. Excursion, confirming a record made by Dr A. S. Watt from withered fruiting material in December 1947; Denton Fen, R. A. Boniface and F. Rose; an interesting extension of the range of this species which was previously known only from Wood Walton Fen.

722/1 Sparganium neglectum Beeby; Monks' Wood, A. J. Wilmott, Exc.; Hartford, B. Welch, Exc.

*737/23 Potamogeton Berchtoldii Fieb.; Hartford, J. G. Dony, Exc., det. J. E. Dandy and G. Taylor. The first record for the county; previous specimens seen by Dandy and Taylor were *P. pusillus* L.

||824/2b Poa angustifolia L.; railway embankment between Buckden and Huntingdon, J. G. Dony, Exc., det. C. E. Hubbard.

825/2×3 Glyceria fluitans (L.) R. Br. × G. plicata Fr.; Warboys, C. D. Pigott; previously recorded from Oakley Dyke, Druce (1926A).

†826/18 Vulpia Myuros (L.) Gmel.; Connington Dump, J. E. H. Blackie, J. G. Dony and H. B. Souster; not recorded since 1883.

||†828/3 Brachypodium distachyon (L.) Beauv.; railway siding, Huntingdon, D. A. Davies and J. G. Dony, det. C. E. Hubbard.

849/1 Blechnum Spicant (L.) Roth; Holme Fen, J. G. Dony, Exc.; last seen at Holme Fen in 1883 by A. Fryer, only other record Whittlesey Mere, 1860, F. Paley (Druce, 1926A).

850/1 Phyllitis Scolopendrium (L.) Newm.; Stibbington, 1938, J. L. Gilbert; railway bridge, between Buckden and Huntingdon, J. G. Dony, Exc.; previous records, Somersham, W. W. Newbould; Elton, G. C. Druce (1926A).

§*†851/5 Asplenium Adiantum-nigrum L.; old wall, St Ives, J. G. Dony, Exc.; found also on church wall, St Ives, C. D. Pigott.

§*853/1 Athyrium Filix-femina (L.) Roth; Holme Fen, Cambridge Nat. Hist. Soc. Excursion.

§854/3 Polystichum aculeatum (L.) Roth; Stibbington Church wall, ? native, J. L. Gilbert; recorded from Whittlesey Mere, 1860, J. Paley (Druce, 1926A).

||856/1(2) Dryopteris Borreri Newm.; Holme Fen, R. A. Boniface and F. Rose.

856/3 Dryopteris spinulosa (Müll.) Watt; Holme Fen, R. A. Boniface and F. Rose, Soc. Excursion. Last seen at Holme Fen in 1886 by A. Fryer (Druce, 1926A).

THE STATUS OF ANCHUSA SEMPERVIRENS L. IN THE PLYMOUTH AREA OF SOUTH DEVON

By J. G. Vaughan.

This study was carried out in the Summer of 1948 in an attempt to determine the status of *Anchusa sempervirens* L. in the Plymouth area of South Devon. The plant on the Continent extends along parts of the west coast of France and through the Iberian Peninsula to the western parts of the Mediterranean. In these places its natural habitats are along the borders of woods and in bushy places.

One might expect, from this geographical distribution, that the plant would occur as a native in S.W. England where it is to be found in some quantity. The plant was first recorded in Britain in 1724 by Sherard as *Buglossum latifolium sempervirens*, near Horns Place, Rochester (Druce, 1932). In Hooker (1831), the Rev. J. S. Tozer reports that *Anchusa sempervirens* is "certainly wild in Devon and Cornwall" but no definite stations are given. This statement is repeated by Watson (1835). In the Supplement to Vol. 2 of Watson's work, W. A. Bromfield reports the plant "truly wild in a retired lane, on a bank amongst weeds, a few miles from Plymouth." Bromfield (1856) repeats his claim of having gathered the plant wild in Devon, together with a similar claim for the Channel Islands. Briggs (1880) expresses the opinion that the plant is a denizen or alien rather than a native species because it is almost always found near buildings together with plants that have certainly been derived from gardens. He mentions Bromfield's claim of having found the plant wild near Plymouth and thinks that ths station is Efford Lane [unfortunately Efford Lane has now been more or less destroyed by building]. Dunn (1905) writes of *Anchusa sempervirens*, "The distribution of this species is from Portugal to England. The confidence with which it is claimed as a native by the authors of local Floras decreases in proportion as it extends towards the north. It is, however, so claimed by botanists in Western France,* Normandy,* Jersey and Southern England, and, being a plant of decidedly western range, it may be admitted to our Flora. It is not uncommon as an escape from gardens." Davey (1909) regards the plant as a denizen. This, too, is the opinion expressed by Martin and Fraser (1939). Jones and Kingston (1829) give no definite information. Thus it is seen that, apart from a small number of early workers, most botanists regard the plant as a denizen or alien.

*It should, however, be noted that Fournier (1946) treats it as rare and only cultivated or rarely subspontaneous, and that Rouy (1908) questions its spontaneity in Normandy though apparently regarding it as native in Brittany, where he says it is not rare.

If this view is accepted then the origin of the plant in the south-west should be elucidated. It is well known that " Alkanet " has been used in herbal medicine. Hippocrates used the plant, while a list of its virtues is to be found in Culpeper's Herbal. The Whitworth doctors of Lancashire, who flourished in the early part of the nineteenth century, sold a " Red Bottle " composed of oil of Origanum, Anchusa root and Methylated Spirit (Leyel [n.d.]). Brook (1846) gives an account of the virtue of *Anchusa officinalis*:—" It has the credit of an astringent and vulnerary but it is little used. The best way of giving it is to add half an ounce to a quart of Hartshorn spirit; it gives a good colour and enriches the virtue." I have no definite information relating to the use of *Anchusa sempervirens* in herbal medicine in Britain although Dr. R. Melville of Kew reports a statement that, according to de Lobel, the species was cultivated in this country in the sixteenth century. My own investigation into the distribution of the plant in the Plymouth district somewhat supports the possibility that it was cultivated in this country a number of centuries ago. To-day Alkanet is used as a colouring agent for oily or greasy compounds such as pomades, hair oils and ointments (Wren, 1932).

My own investigations into these problems were carried out mainly in the Plymouth and Plympton districts of South Devon. I attempted, with the aid of local botanists, Briggs' *Flora of Plymouth*, and school children, to establish as many stations as possible for the plant. I then investigated each with a view to forming an opinion on the status of the plants found there—whether they were native or denizen.

The stations recorded by Briggs are indicated by (B). The numbers of plants are approximate. The dates of the old Plympton buildings mentioned are taken from Devonshire Association, *The Hundreds of Plympton and Ermington in Early Times.*

(1) 18 plants in and about Plympton St Mary churchyard. This church dates back to the end of the thirteenth century or the beginning of the fourteenth century and, even before these times, there was a Saxon monastery on the site of the present church (B).

(2) 50 plants in and about the Hay Farm (on the Plympton-Elburton Road) (B).

(3) 30 plants around an old workshop in Newnham Park. It is recorded that there were buildings in Newnham Park well before the seventeenth century (B).

(4) 15 plants in an old garden in a wood near Elfordleigh Lodge. This garden is said by local inhabitants to be " very old." The garden is in such a position that it is hardly likely that the plant has invaded the garden so it is probable that it was originally cultivated there (B).

(5) 4 plants in the hedge next to Efford Open Air School. This hedge borders a little lane known as Muddy Lane, which is a branch of Efford Lane. The main Efford Lane has now been more or less destroyed by building. Briggs stated that this is possibly the " wild "

station of Bromfield. To me this seems hardly likely because there are in the vicinity of Efford Lane, old farm buildings and orchards (B).

(6) 50 plants in the hedges around the Butlass Farm buildings. Butlass, or Batesford as it was then known, farm was known to exist in 1295 (B).

(7) 100 plants in hedges in the very near vicinity of old houses in Thornbury (B).

(8) 6 plants at the side of a road just outside Egg Buckland village (B).

(9) 13 plants on railway bank near St Mary's Bridge in Plympton St Mary. This is not definitely recorded by Briggs, although the station is very near to the Plympton St Mary churchyard.

(10) 4 plants at the top of Venton Lane extremely near to the village of Sparkwell. This is a very old village. In addition it appears that the plant is to be found growing just inside one of the village gardens. This kind of invasion by *Anchusa sempervirens* has recently been reported from the Kew neighbourhood (Hutchinson, 1945).

(11) 32 plants on the premises of the Hele Farm near Bickleigh. This is probably the Hayle to which Briggs referred (B).

(12) Briggs recorded the plant in Bickley itself. Mr E. M. Phillips of Plymouth has recently seen the plant growing near the village (B).

(13) 65 plants in a hedge at the side of the road as one approaches Halwell Farm from Elburton. It is recorded that Halwell existed in 1086. Briggs does not cite this station, although he mentions Elburton which is near Halwell.

(14) Cornwood—50 plants in a hedge and field near Houndall (Briggs' " Oundle ") Farm. One plant near barn at Wisdome Farm (B).

(15) 9 plants near new houses (built 1938) at Wembury Point. This is a new kind of situation, for there are no old buildings and the plant is not cultivated in the gardens of the houses.

(16) 220 plants bordering a path that leads from Langdon Court through a wood to the West Wembury Road—also on the fringes of a wood at the side of this road. This wood contains various ornamental plants such as Conifers and Rhododendrons. This station somewhat resembles the true native stations on the continent, but the proximity of Langdon Court and Langdon Farm rather suggests that the plant here is a denizen. 100 plants a little further up the road towards West Wembury at the side of the road. This last situation is right against the Langdon Farm buildings which are very old (reported 1238) (B).

(17) 140 plants scattered throughout the village of Spriddlestone. Quite a number of the village buildings are very old, dating back to about 1316 (B).

(18) 100 plants to be found at various situations in the village of Brixton. This village is again very old, for the church, at least, was built about the same time as that at Plympton St Mary (B).

(19) A single plant growing on a bank on the right hand side of the road, 200-300 yards outside Efford Farm towards Stonycross. This is not very near buildings.

(20) 18 plants in a hedge and on a piece of waste ground just outside Plympton where the Exeter road branches to Sparkwell. There is a garden very near to this situation, but is a new one, associated with a reservoir building.

(21) 100 plants just outside Wembury on both sides of the road to Langdon Court. On the left side in the fringes of a wood; on the right side on ground overgrown with young trees. This ground was obviously cultivated at one time and there is a ruin of an old house nearby.

(22) 100 plants on the left side of the road going to Treby as a road branches off the main Smithaleigh-Yealmpton Road (this is opposite the road that leads to Lyneham). There are no buildings very near to this station (B).

(23) 18 plants on the left side of an evergreen track that leads from the Smithaleigh-Yealmpton Road to Worston. This situation is very near to an orchard and ruined farm buildings.

(24) 60 plants on the left side of the road as one enters Wilburton.

(25) 6 plants around the church at Yealmpton.

Two additional stations but outside the Plympton area are as follows: —

(26) 33 plants in the fringes of a wood on the left side of a road going to East Looe (Cornwall). This station is adjacent to the Lodge of Morval House.

(27) 50 plants both sides of a rough track (Fleet Mill Lane) near Totnes. This, at first, appeared to be a wild situation but, on following the plants, an old cottage was reached. The plant was found just outside the garden of the cottage in association with *Ballota nigra* L. and *Chelidonium majus* L. Briggs writes of *Ballota* as a plant growing near to dwelling places but not having originated from gardens. However, he regards *Chelidonium* as a definite denizen.

I think it is possible to draw, from the preceding account of *Anchusa sempervirens* in the Plymouth and Plympton areas of South Devon, a number of tentative conclusions. To begin with, the mass of evidence points to the plant being a denizen. Most of the stations are near buildings, there being hardly any stations like those on the continent. I have mentioned the plant in three places where it might possibly be native (stations 15, 19 and 22) but the small numbers of plants at these points suggest that they are the result of dispersal from other well established stations. A large number of the stations are near buildings a number of centuries old. To me, this indicates the possibility that the plant was at one time cultivated in the area investigated although I have not been able to find any records confirming this. The fact that the plant does not seem to have spread much since the days of Briggs is probably the result of its inefficient mechanism for seed dispersal (the simple separating of four nutlets).

I should like to thank Professor R. Good, Mr E. M. Phillips and the late Mr A. J. Wilmott for help when I was doing the work on which this paper is based.

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NOMENCLATURE AND CORRECTIONS TO BRITISH PLANT LIST VII

By E. F. Warburg.

This feature was in course of preparation by the late Mr A. J. Wilmott at the time of his death. At present, only his rough notes are available. The following list is therefore confined to additions and changes made necessary by material published in *Watsonia* during the past year, including some name changes made in Plant Records which are explained below. References cited only by page numbers refer to *Watsonia*, **1**.

44 **EROPHILA.**

5 *conferta* Wilmott. See paper by Wilmott, pp. 137-138.

170 *CORONILLA*

4 *glauca* L. See Plant Notes.

185 **RUBUS.** See paper by Watson, pp. 71-83, unless another reference is given.

9(2) **Briggsianus** (Rog.) W. Wats.—1946, *J. Ecol.*, **33**, 337. Vice 9b.

18(4) **latiarcuatus** W. Wats.

[19 **argenteus** Weihe & Nees. Delete.]

41(2) **sciocharis** (Sudre) W. Wats.—1946, *J. Ecol.*, **33**, 339; *R. gratus* ssp. *R. sciocharis* Sudre, 1907, *Bat. Eur.*, 68. Vice *R. sciaphilus* Lange, 1883, non Lef. & Muell., 1859 (see 1938, *Rep. Bot. Soc. and Exch. Club*, **11**, 445) and 41b. (*B.P.L.*).

53(3) **Libertianus** Weihe.

56(3) **albionis** W. Wats. Vice 56 b.

61 **bracteosus** Weihe—in Lej. & Court., 1831, *Comp. Fl. Belg.*, **2**, 162; *R. orthoclados* A. Ley, 1896. See Watson, 1946, *J. Ecol.*, **33**, 340.

65(2) **macroacanthos** Weihe & Nees.

67(4) **hypomalacus** Focke.

67(5) **silesiacus** Weihe.

95(2) **Watsonii** Mills. See paper by Mills, pp. 135-136.

98(3) **melanoxylon** Muell. & Wirtg.

98(4) **Reichenbachii** Koehl. ex Weihe.

102 **breconensis** W. Wats. *R. Lejeunei* Rogers, *Handbook*, 70, non Weihe.

102(3) **Lejeunei** Weihe.

108(3) **Menkei** Weihe.

110(5) **fusciformis** Sudre.
111(2) **adornatiformis** (Sudre) Bouv.
120(2) **foliosus** Weihe.
122(3) **scabripes** Genev. Vice 122c.
130(2) **humifusus** Weihe.
137 **angustifrons** Sudre. Delete brackets.
[139 **serpens.** Delete.]
140(2) **Guentheri** Weihe.
147(2) **pygmaeus** Weihe.
149(3) **purpureicaulis** W. Wats. Vice 149h. See paper by Watson, pp. 289-290.
149(4) **Babingtonianus** W. Wats. See paper by Watson, pp. 289-290.

190(2) **APHANES** L. See paper by Walters, pp. 163-169.
1 **arvensis** L. Vice 190/19.
2 **microcarpa** (Boiss. & Reut.) Rothm.

299(1) *PHUOPSIS* Benth. & Hook. f. See Polunin, 1942, *Rep. Bot. Soc. and Exch. Club*, **12**, 356-358.
1 *stylosa* (Trin.) Benth. & Hook. f. ex Jacks. N.W. Persia. Vice 299/3 *Crucianella stylosa* Trin. (see 1946, *Rep. Bot. Soc. and Exch. Club*, **12**, 663).

354 *GALINSOGA.*
2 *ciliata* (Raf.) Blake. Vice 2b. *G. quadriradiata* var. *hispida* (DC.) Thell. (see 1939, *Rep. Bot. Soc. and Exch. Club*, **12**, 44, 94). See paper by Lousley, pp. 238-241.

411 **LAPSANA.**
2 *intermedia* M. Bieb. See paper by Burtt, pp. 234-237.

416 **CREPIS.** See Review, pp. 195-199.
1 **mollis** (Jacq.) Asch.—1864, *Fl. Brandenb.*, 386; *Hieracium molle* Jacq., 1774, *Fl. Austr.*, **2**, 12.
9 **foetida.**
A. **eufoetida** Beger ex Domin—1935, *Preslia*, **13-15**, 252. Vice subsp. *vulgaris* (Bisch.) Babc., 1938 (see 1939, *Rep. Bot. Soc. and Exch. Club*, **12**, 26) and a. *vulgaris* Bisch. (see 1934, *Rep. Bot. Soc. and Exch. Club*, **10**, 485).
B. *rhoeadifolia* (Bieb.) Schinz & Thell.—in Schinz & Keller, 1914, *Fl. Schweiz*, ed. 3, **2** (*Krit. Fl.*), 361. Vice 3b. *hispida* Bisch. (see 1934, *Rep. Bot. Soc. and Exch. Club*, **10**, 485).
C. *commutata* (Spreng.) Babc.—1938, *J. Bot.*, **76**, 207. Vice 414/1.
13 *sancta* (L.) Babc.—1941, *Univ. Calif. Publ. Bot.*, **19**, 403; *Hieracium sanctum* L., 1756, *Cent. Plant.*, **2**, 30. Vice 418/1.

14 *Zacintha* (L.) Babc.—1941, *Univ. Calif. Publ. Bot.*, **19**, 404; *Lapsana Zacintha* L., 1753, *Sp. Plant.*, 811. Vice 430(2)/1 *Zacyntha verrucosa* Gaertn. (see 1932, *Rep. Bot. and Exch. Club*, **10**, 27).

416(2) *AETHEORRHIZA* Cass.—1827, *Dict. Sci. Nat.*, **48**, 425.

1 *bulbosa* (L.) Cass.—1827, *loc. cit.* Vice *Crepis bulbosa* (L.) Tausch (see 1929, *Rep. Bot. Soc. and Exch. Club*, **8**, 618, 880). See Review, p. 199, and Babcock & Stebbins, 1943, *Univ. Calif. Publ. Bot.*, **18**, 235-240.

558 MENTHA.

3 **longifolia**

i. **horridula** Briquet. Vice 3×4=*Nouletiana*. See paper by Graham, p. 278.

566 SALVIA.

[21 *lanceolata* Willd. (see 1939, *Rep. Bot. Soc. and Exch. Club*, **12**, 53). Delete ; =20 *reflexa* Hornem. (see 1929, *Rep. Bot. Soc. and Exch. Club*, **8**, 634). See Plant Notes.]

615 POLYGONUM.

25 *cognatum*. See Plant Notes.

a. *alpestre* (C. A. Mey.) Meisn.

b. *ammanioides* (Jaub. & Spach) Meisn.

650 SALIX. See paper by Rechinger, pp. 271-275.

6(2) *dasyclados* Wimm. Vice "6 [×] *acuminata* (Sm.)."

6(2)×5 =*Taylori* Rech.

10×8×6

11(2)×6

11(2)×10×6 =**angusensis** Rech.

668 EPIPACTIS.

3(5) **cambrensis** C. Thomas. See paper by Thomas, pp. 283-288.

683 *CROCOSMIA* Planch.—1851-2, *Flores des Serres*, **7**, 161.

1 ×*crocosmiiflora* (Lemoine) N.E.Br.—1932, *Trans. R. Soc. S. Afr.*, **20**, 264 = *C. aurea* (Pappe) Planch. × *C. Pottsii* (Baker) N.E.Br.; *Montbretia crocosmiaeflora* Lemoine [? *Cat.*, 1881] et ex Morren, 1881, *La Belgique Horticole*, **31**, 299, et apud André, 1882, *Rev. Hort.*, **54**, 124; *Tritonia crocosmiiflora* (Lemoine) Nichols., 1887, *Dict. Gard.*, **4**, 94. Transferred from *Tritonia* to *Crocosmia* by N. E. Brown, *loc. cit.*—From A. J. Wilmott and H. K. Airy Shaw.

744 **CYPERUS.**

4 *Eragrostis* Lam., 1791, *Tabl. Encycl. Bot.*, **1**, 196; *C. declinatus* Moench, 1794, (*B.P.L.*); *C. vegetus* Willd., 1798, *Sp. Pl.*, 283 (*nomen abortivum*).—A. J. Wilmott.

844 **EQUISETUM.** See paper by Alston, pp. 149-153.

7(2) **Moorei** Newm.—1854, *Phytologist*, 19. Vice 7b. and 7(2) *occidentale* (Hy) Coste (see 1929, *Rep. Bot. Soc. and Exch. Club*, **9**, 42).

7(3) **ramosissimum** Desf.

876 **CHARA.**

16 **globularis** Thuill. (1799, *Fl. Env. Paris*, ed. 2, 472) emend. Zanev. (1940, *Blumea*, **4** (1), 191). Vice *C. fragilis* Desv. in Loisel., 1810, *Not. Fl. Fr.*, 137.

a. **capillacea** (Thuill.) Zanev.—1940, *loc. cit.*, 195; *C. capillacea* Thuill., 1799, *loc. cit.*, 474; *C. fragilis* Desv., 1810, *loc. cit., sensu stricto*; *C. pulchella* Wallr. var. *capillacea* (Thuill.) Wallr., 1833, *Fl. Crypt. germ.*, **2**, 109.

b. **globularis** (Thuill.) Wilmott, comb. nov.; *C. globularis* Thuill., 1799, *loc. cit., sensu stricto*; *C. pulchella* Wallr. var. *globularis* (Thuill.) Wallr., 1833, *loc. cit.*; *C. Hedwigii* Ag. ex Bruz., 1824, *Obs. Char.*, **7**, 21; *C. fragilis* Desv. var. *Hedwigii* (Ag. ex Bruz.) Kütz., 1843, *Phyc. Gen.*, 319.

Zaneveld (1940, *loc. cit.*) appears to have been the first to combine Thuillier's two species under one of his names.—From G. O. Allen and A. J. Wilmott.

PLANT NOTES

Compiled by the late A. J. Wilmott.

160/4. Lotus uliginosus Schkuhr. 2, E. Cornwall; R. Fowey near Dozmary Pool, September 1948. A curious, submerged form with green, irregularly twisted stems and minute leaves about 1 cm. apart, 1½-2 mm. long. Not flowering. It was more extreme than Glück's forma *submersus* (Glück, H., 1911, *Biologische und morphologische Untersuchungen über Wasser- und Sumpfgewächse*, **3**, 93), which was found wild in a small pond in the Solitüde near Erlangen (October 1907), and also produced experimentally at Heidelburg by sinking a land plant in a pot in 60 cm. deep water from July 5th to the 25th, 1899. In Glück's experiment completely submerged shoots with 4-10 internodes developed in the axils of former aërial leaves. Some of these shoots were unbranched, in others they had 1-3 lateral branches. The length of the shoots was reduced to about ½-⅓ that of corresponding shoots in the land form. The submerged internodes were semi-transparent and very brittle, while the aërial internodes were dark green. The submerged leaves were similar to the aërial leaves but much smaller. These leaves were 3-7 mm. long and 3-6 mm. broad, and internodes 5-20 mm. long.—A. H. G. Alston.

†170/4. **Coronilla glauca** L., 1754, *Cent. Pl.*, **1**, 23. 3, S. Devon; naturalised on the cliff below Rockend, Torquay, March 1949, E. F. Warburg. A well-known greenhouse plant, only capable of being grown out of doors in the warmer parts of England. A shrub up to 50 cm. high. Leaves glaucous, imparipinnate, with 2-3 pairs of obovate leaflets; stipules small, linear-lanceolate, caducous. Flowers yellow, 5-8 in umbels. Pods with 2-3 oblong articulations. Native of the Mediterranean Region. The plant was growing among *Phlomis fruticosa* L. which was present in much greater quantity. It was evidently coming up from self-sown seed. It doubtless originated in a neighbouring garden though the parent plants were not traced. The general vegetation was hawthorn scrub, though other species—some of them alien (e.g. *Quercus Ilex* L.)—were also present.—E. F. Warburg.

†566/20. Salvia reflexa Hornem., 1807, *Enum. Pl. Hort. Hafn.*, **1**. 34; Gams, 1927, in Hegi, *Ill. Fl. Mittel-Europa*, **5** (**4**), 2477, fig. 3331, 1 (stamens); Epling, 1938-9, *Repert. Sp. Nov., Beihefte*, **120**, 102, pl. 13, fig. 29 (stamens); Moldenke, 1949, *American Wild Flowers*, 297.

S. lanceolata Brouss., 1805, *App. Elench. Pl. Hort. Monsp.*, 15; Jacquin, 1811-1813, *Eclogae Plantarum*, **1**, 22, t. 13; *non S. lanceolata* Lam., 1791; *S. lanceifolia* Poir., 1817, in Lam., *Encycl. Suppl.*, **5**, 49;

Britton & Brown, 1913, *Ill. Fl. Northern States and Canada*, ed. 2, **3**. 130, fig. 3632.

18, S. Essex; waste ground, Dagenham, August 1949, N. Y. SANDWITH [Ref. No. 3508]. An erect, much branched annual, 2-3 ft. high. Leaves linear-oblong or linear, 2-4 cm. long and 0.5-1.3 cm. wide, subentire, remotely crenate-serrate, greyish hoary, faintly foetid. Flowers in narrow, interrupted, spike-like inflorescences, 2-3 in each verticillaster. Calyx 4-6 mm. long, widely gaping in fruit. Corolla small, less than 1 cm. long, very pale bluish-mauve, almost whitish-mauve.

There are two previous records of this species from Britain, one from Fritton, Norfolk, in *B.E.C. 1928 Rep.*, p. 634 (1929), the other from Sibbertoft, Northants, in *B.E.C. 1938 Rep.*, p. 53 (1939). The second record was published under the name *Salvia lanceolata* [in black type] Willd., *Enum.*, 37 (1809). This was misleading and inaccurate: not only was the plant not new to the British list, but Willdenow should not have been cited as the author of the name, since he was not describing a new species but was listing and describing *S. lanceolata* Brouss.

This species is a member of Epling's Section *Glareosae* of the large Subgenus *Calosphace*, which is wholly American and has not otherwise been represented in the *British Plant List*, although many of the showy species (e.g. *S. patens* Cav., *S. farinacea* Benth., *S. splendens* Sellow, *S. fulgens* Cav.) are well known in cultivation. *S. reflexa* itself is anything but a garden plant, and is a common weed on plains and mesas of the Central United States, extending southwards to Texas and Arizona and thence as far as Central Mexico. Dr Moldenke, who calls it "Rocky Mountain Sage," remarks that it is of special interest because of the medicinal properties attributed to it. *S. reflexa* has occurred frequently as an adventive in Central Europe, being introduced with grass-seeds and grain. At Dagenham it was growing near *Hibiscus Trionum* L., which has become a common weed in the United States. Jacquin's lovely coloured plate (*loc. cit. supra*) gives a perfect representation of *S. reflexa*, but the corollas of the Dagenham specimens were much paler.—N. Y. SANDWITH.

†593/4. HERNIARIA CINEREA DC. (not "Lam. & DC." as printed in *B.P.L.*). This species, which differs from *H. hirsuta* L. in its ashy-grey appearance, in the ascending ends of the branches, and in the sepals having longer subequal stiff hairs and not ending in a bristle, has been correctly identified and reported from several localities. It seems, however, that all records of *H. hirsuta* from Burton-on-Trent, Staffs., v.-c. 39, should be referred to this species. The following material from that town is all *H. cinerea*:—

Herb. Lousley: on gravel heaps near Bass's Brewery, August 29, 1936, *J. E. Lousley*.

Herb. R. C. L. Burges: dry gravelly place, Shobnall Road, August 29, 1936, and loose asphalt, Shobnall Road, September 1945, *R. C. L. Burges*.

Herb. Druce, Oxford University (all det. E. F. Warburg): in plenty on the railway siding and waste ground, 1926, *Druce & Curtis* (det. Thellung as *H. hirsuta*, April 1927); Burton-on-Trent, July 1930, *G. C. Druce*; Burton (no date), *G. C. Druce*.

The records for *H. hirsuta* in *B.E.C. 1931 Rep.*, 468, 1932, and *B.E.C. 1943-4 Rep.*, 816, 1948, should be amended to *H. cinerea*.—J. E. Lousley.

615/6-8. Polygonum spp. 23, Oxon; a colony similar to that reported in the 1946-7 Plant Notes in a field at Freeland, Oxon, in September 1948. So completely had the sown crop failed that I wondered if by any chance the *Polygonum* was the crop and some use had been found for it. It was a beautiful sight; the plants averaged about 3 ft. in height and individuals ranged in colour from pale green to deep cherry-red. *P. lapathifolium* predominated, with *P. nodosum* running it fairly close. *P. Persicaria* was not abundant. At the lower end of the field the Polygonums thinned out and there was a certain amount of *Brassica alba*. Along the path at the top end there was also a quantity of *P. Convolvulus*.—B. M. C. Morgan.

†615/25. Polygonum cognatum Meisner, 1826, *Monographiae Generis Polygoni Prodromus*, 91. On July 31, 1948, I took R. Graham and D. McClintock to see the plant discovered by G. C. Brown at Hythe Quay, Colchester, v.-c. 19, in 1925, and subsequently named by Dr Thellung *P. cognatum* Meisn. var. *alpestre* (C. A. Mey.) (see *B.E.C. 1925 Rep.*, 1062; *1926 Rep.*, 275; *1928 Rep.*, 924). It persisted in about the same quantity as when I first saw it in 1936. On the following day at Felixstowe Docks, E. Suffolk, v.-c. 25, I found with Mr McClintock a large (c. 1 × 2 metres) patch of a prostrate *Polygonum* near railway lines which at first sight seemed likely to belong to a different species. From the Colchester plant it differed in being more closely appressed to the ground, in the shorter (c. 5 mm.) internodes, in the leaves being shorter, acute and linear-lanceolate (c. 15 × 2.5 mm. as compared with c. 30 × 12 mm. average) and in the flowers being more conspicuous. Examination of a long series of *P. cognatum* from India and the Orient in Herb. Kew showed that the species is very variable and that the Colchester and Felixstowe plants could be matched by extreme specimens of the series connected by many intermediates. British material in my own collection and elsewhere was also found to show some corresponding variation.

The Felixstowe plant agrees with *P. ammanioides* as described and illustrated by Jaubert & Spach, 1844, *Ill. Pl. Orient.*, **2**, 28, *t.* 119. These authors also illustrate (*t.* 118) *P. alpestre* C. A. Meyer, 1831, *Verz. Pfl. Cauc.*, 157, which is the Colchester plant.

A later account of the genus by Meisner (1856, in De Candolle, *Prodr.*, **14**, 96) contrasts the two plants as varieties of *P. cognatum* as follows:—

α *alpestre*, pedicellis calyce brevioribus, caulibus elongatis (pedalibus et ultra), foliis plerumque majoribus.

γ *ammanioides*, pedicellis calycem subaequantibus, caulibus elongatis, foliis minoribus saepius anguste lanceolatis acutis, brevius petiolatis. In Persiae . . . .

Boissier (1879, *Fl. Orient.*, **4**, 1037-8) treated *P. alpestre* C. A. Mey. as a species, of which he treated *P. ammanioides* as a variety.

Pending further research the two plants should stand in *B.P.L.* as follows: —

615/25. *P. cognatum* Meisn.
a. *alpestre* (C. A. Mey.) Meisn.
b. *ammanioides* (Jaub. & Spach) Meisn.

Other British material referable to var. *ammanioides* has been collected at intervals from Westerley Wear, Kew Green, Surrey, v.-c. 17, by various collectors (e.g. *A. B. Jackson*, 1917, in Hb. Lousley). Although less extreme than the Felixstowe plant this can hardly be separated from it. The *Polygonum* was established at this locality from before 1872 (1872, *J. Bot.*, **10**, 338) until destroyed by construction of tennis courts in 1923 (*B.E.C. 1928 Rep.*, 924). The *Polygonum cognatum* which has long been established at Wetmore Road railway sidings, Burton-on-Trent, Staffs., v.-c. 39, is intermediate between the two varieties (*J. E. Lousley*, August 29, 1936, in Hb. Lousley).

It is evident that the leaves on the extremities of the branches of var. *ammanioides*, as seen late in the season, are much narrower than the earlier lower leaves. But even when allowances are made for this seasonal variation, the constancy of the Kew and Colchester plants as collected over a long period and the remarkable difference between the two varieties suggests that they may have a genetic basis.—J. E. LOUSLEY.

637/2. URTICA URENS L.; composition of stinging fluid. [Emmelen, N., and Feldberg, W. (1947, *J. Physiol.*, **106**, 440-455) have shown, by physiological tests, that the fluid in the stinging hairs of *U. urens* contains histamine (0.02-0.01%) and acetylcholine (over 1%), besides a third unidentified component having similar (smooth-muscle-contracting) properties. Histamine is responsible for the " triple response " (reddening, wheal, flare) to the skin; as well as the residual itching sensation; acetylcholine by itself has little irritant action, but in combination with histamine it produces an immediate stinging pain. The effects of a nettle sting can be approximately imitated by pricking a solution of histamine and acetylcholine into the skin, so that the function of the third component is not clear; doubtless it reinforces the effect of the other two. Histamine and acetylcholine were also detected in the nettle leaf tissue, where it may be formed and later transported to and concentrated in the hairs.]

Histamine is a compound which is normally present in very small quantities in animal cells. Certain stimuli—notably the presence of a foreign protein—cause an accumulation of excessive (although still very small) amounts of histamine in the cells, and lead to various reactions

on the part of the body. The most interesting of these are "allergic" manifestations such as nettlerash, hay-fever, asthma, etc., which may be provoked violently by a seemingly tiny stimulus; they can also be produced directly by administration of histamine. Acetylcholine is a substance, having somewhat similar properties, and believed to be involved in the mechanism of transmission of impulses along the nerves.

Acetylcholine and particularly histamine appear to be of rare occurrence in the vegetable kingdom; both are present in ergot, and acetylcholine is reported to occur in *Capsella*. How the combination originated in the nettle must be a matter for speculation; it is conceivable that they are normally present in plants, as in animals, in connection with protein degradation or synthesis, and that the nettle gained an evolutionary advantage when it became possessed of unusually high concentrations of the two compounds in its hairs. It would be interesting to know whether other stinging plants, e.g. in the *Loasaceae*, function by the same agency, and also what is the agent in certain *Myosotis* and *Primula* which cause allergic reactions in many individuals.

It has for some time been recognised that the sting of a nettle involved the release of histamine in the cells affected, but until the publication of this paper it was believed that this was a response of the cells to some allergen in the stinging fluid. Emmelen and Feldberg have now shown that the mechanism is much simpler. The stinging fluid of wasps and bees is believed to contain a protein, which provokes release of histamine by the cells in the stung area. The notion that both nettle and wasp stings are due to formic acid is still popularly current, but appears never to have had much foundation on experimental evidence. The idea probably arose from the fact that ants contain appreciable amounts of this acid, and that it is corrosive and irritant, but as Emmelen and Feldberg point out, its effect is not like that of a sting.—D. P. Young.

669/"10": 9×10? "Orchis maculata superba": Dombrain, [Rev.] H. H., 1866, *The Floral Magazine*, **5**, plate 308. The plate is good, and shows one of the hybrids between a spotted and a marsh orchis, probably *O. ericetorum* (Linton) E. S. Marshall crossed with *O. purpurella* T. & T. A. Steph. "The normal type of the plant we here figure is by no means rare, but the variety *superba* has only been lately brought into notice; we learn, from the firm of Messrs Osborn and Son, of Fulham, by whom it was exhibited, that 'it was found growing wild in Ayrshire, but where and by whom we do not know, it having passed into our hands through the respected firm, the Messrs Samson, of Kilmarnock. It is perfectly hardy . . . exhibited at the scientific meeting of the Royal Horticultural Society . . . it was awarded a first-class certificate'."

It shows the hybrid vigour so characteristic of hybrids between *O. ericetorum* and *O. praetermissa*, the tuft of large bracts under the spike being a feature of such hybrids, in my own experience. As *O. praetermissa* does not occur in Ayrshire, being replaced by *O. purpurella*, often in the form formerly called *O. praetermissa* var. *pulchella*, one must

presume the parentage suggested above. Attention is called to the plate as the book is rare, and although the triverbal name is at present illegitimate, it is possible that usage may later legitimise such names.—A. J. WILMOTT.

669/11 × 674(3)/1. ORCHICOELOGLOSSUM on the Wiltshire Downs. In his article printed in Part IV of this Journal, Mr Grose suggests that the presence of " ring spots " on the leaves may indicate the influence of a marsh orchis. I consider this view entirely mistaken, and that " ring spots " are characteristic of *Orchis Fuchsii*, in which the " blobs " —as I call the large maculae—are very commonly paler in the centre and often so pale as to produce the ringed appearance.

The maculation on the leaves of marsh orchids is of such differing types that it is misleading to refer to all the markings as " spots." For that reason I have in my notes distinguished between " dots," such as the tiny marks common in some forms of *O. purpurella* T. & T. A. Steph., " spots," larger markings up to about one-eighth of an inch diameter, " blobs," the larger markings so common in *O. Fuchsii* (" oval transverse blobs ") and in *O. mascula*, and " blotches " for the confluent blobs which are sometimes to be found in *O. occidentalis*.

I have expressed the opinion that ring-spots in marsh orchids indicate the influence of *O. Fuchsii* (1946, *B.E.C. 1943-44 Rep.*, 687-689), and, as I have never yet seen any locality where " *O. pardalina* Pugsl." can be found growing pure, continue to hold that view, which seems true of all the ring-spots which I have seen on marsh orchids. I think there is little doubt that Mr Grose's plant is *Coeloglossum viride* × *Orchis Fuchsii*.—A. J. WILMOTT.

753/51. CAREX BIGELOWII Torr. ex Schwein. f. **infuscata** (Drejer) Nelmes, comb. nov.; *C. saxatilis* L. f. *infuscata* Drejer, 1841, *Rev. Caric. Bot.*, 43; *C. rigida* Gooden. f. *juncelliformis* Almquist apud Neuman, 1901, *Sverig. Fl.*, 707.

97, Westerness; on Rois-bheinn (Roshven), near Lochailort, a single large tuft, 3rd September, 1949, J. E. RAVEN.

I have not seen Drejer's type nor his original description, but Mr John Raven's plant agrees with the description of forma *infuscata* in Kükenthal's monograph of the *Caricoideae* (1909, Engler *Pflanzenreich*. **IV**, **20**, 301): " Culmus gracilior. Folia angustiora erecta. Spiculae tenuiores laxiores." The more erect and narrower leaves and the smaller, laxer spikes give this Westerness plant a facies clearly distinct from typical *C. Bigelowii*. This species, however, is a rather variable one, and until this critical group of *Carices* is better known one must restrain an inclination to raise forma *infuscata* to varietal rank.—E. NELMES.

872-876. CHARACEAE. As the determination of charophytes ordinarily requires microscopical examination material that is fresh or preserved in a tube of weak formalin is much preferred. If fresh, speci-

mens should be enclosed in a tin with the surplus water drained off. Some fruiting portions should be included if possible.

Where it is only feasible to preserve dried specimens small portions might well be kept separately for examination purposes; this will avoid soaking off pieces from a mounted specimen.—G. O. Allen.

872-876. Characeae. With reference to the note in the *B.E.C. 1943-44 Report*, p. 659, about seventeen sets have been prepared with the help of Mr L. C. Lyon under the title of "British Charophyta—slide series 1—1949."

Each set comprised 24 slides. The species consisted of *Nitella opaca* Ag. ♂♀, *N. flexilis* Ag., *N. spanioclema* Gr. & B.-W., *N. translucens* Ag., *N. mucronata* Miq. var. *heteromorpha* Kuetz., *Tolypella intricata* Leonh., *T. prolifera* Leonh., *T. glomerata* Leonh., *T. nidifica* Leonh., *Chara canescens* Lois., *C. vulgaris* L., *C. vulgaris* var. *longibracteata* Kuetz., *C. hispida* L., *C. contraria* Kuetz., *C. contraria* var. *hispidula* Br., *C. aculeolata* Kuetz., *C. aspera* Willd. ♂♀, *C. fragifera* Dur. ♂♀, *C. delicatula* Ag., *C. delicatula* var. *barbata* (Gaut.) Gr. & B.-W., *C. delicatula* var. *annulata* (Wallm.) Gr. & B.-W.

Distribution included British Museum, Kew, South London Bot. Inst., Edinburgh, Oxford, Cambridge, Leeds, Cardiff, Aberystwyth, Cape Town, New York and Kingston (Rhode Island).—G. O. Allen.

OBITUARIES

Compiled by J. E. Lousley.

Ida Margaret Hayward (1872-1949). The death of Miss Ida M. Hayward on 2nd October, 1949, at Galashiels, recalls the active part she played in recording the extensive alien flora which occurred in that neighbourhood.

Born at Trowbridge, Wiltshire, in 1872, she was connected on both sides of the family with the woollen industry. On the death of her father she and her mother came to reside at Galashiels, where her uncles were engaged in Tweed manufacture.

The wool, imported mainly from Australia, New Zealand, South Africa and South America, contained much extraneous matter, including many prickly fruits and seeds. To free it from these the wool was subjected to drastic treatment, after which the impurities were washed away. One of the uncles, a keen naturalist, noted that some of these fruits and seeds survived the treatment and were able to germinate. He suggested to Miss Hayward, who was interested in Botany, that she should investigate the alien flora which, as a result, flourished intermittently on the banks of the Tweed.

In the years that followed she explored thoroughly the surrounding country, collecting, drying and mounting the strange plants which she found. Thus she built up an unique herbarium, which shortly before her death she presented to the Royal Botanic Garden, Edinburgh. The identification of these plants presented much difficulty. Very fortunately Dr G. C. Druce collaborated with her, and it was he who was responsible for naming them with the help of botanists in many parts of the world.

The results were published in 1919 in a book entitled *The Adventive Flora of Tweedside*. Miss Hayward had recorded 348 alien plants, of which only 89 had been previously noted. It was well that she collected these plants when she did, as new systems of drainage have been installed, where in septic tanks all or nearly all fruits and seeds are destroyed.

In later life she travelled widely, visiting among other places South Africa and South America. By this time she had become interested in the use of coloured film in photography, and so brought back with her many films mainly of botanical interest which she showed to scientific audiences.

Latterly she devoted her time to making coloured films of the scenery and plants of the Scottish Borders. During the war she exhibited these to many audiences and in this way raised large sums of money for local charities. As recently as 1948 she delivered illustrated lectures to the Royal Scottish Geographical Society and to the British Association.

Miss Hayward was a member of this Society (1908), a Fellow of the Linnean Society (1910) and a Fellow of the Botanical Society of Edinburgh (1913). J. Anthony.

Emily Sophia Todd (1859-1949). By the passing of Miss Todd, the Society loses one of its oldest members. The daughter of John Todd, she was born in London on 19th May 1859, and was the youngest of a family of eleven. As a child, Miss Todd spent many holidays at Tummel Bridge, Perthshire, and it was doubtless here that she first acquired that love of botany which was to become her chief interest in life. Her first specimens were gathered at the age of seventeen, and for seventy years she built a herbarium which now contains sheets of nearly every British plant collected by herself.

On the death of her mother in 1907, Miss Todd settled at Aldbourne, Wilts. She regularly let her house for the summer months and resumed her search for the few remaining species to complete her collection. Even in her later years she was a woman of indomitable energy, and at the age of 80 she had been known to wade bare-footed in a marsh for some prized specimen. She died at Wantage on 16th April 1949, and is buried in Aldbourne churchyard.

×*Rosa Toddii* W.-Dod and *Melampyrum silvaticum* L. var. *Toddae* C. E. Britton were named in her honour. Her herbarium is now at the Museum, Swindon, where a large room has been allocated entirely for its display. J. D. Grose.

Eleanor Vachell (1879-1948). Miss Eleanor Vachell, who was for many years one of the most prominent members of the Botanical Society, was born at Cardiff in 1879, the eldest child of Charles Tanfield Vachell, M.D., and his wife Winifred. After attending a small school in Cardiff she went to The Manse, Malvern, and later to St John's, Brighton. She was introduced to field botany by her father, from whom she received her first lesson at Killarney when she was ten. Two years later she was given a copy of Johns' *Flowers of the Field* and a botanical diary. Johns she outgrew, but she continued to record her finds in the diary until near the end of her life. As a girl Eleanor Vachell botanised enthusiastically around Cardiff, on the Glamorgan coast at Southerndown (where an annual stay was made in spring for many years), in the many and varied *locales* of the family holidays, and above all on botanical trips with her father to Scotland, Ireland, Brittany, Norway, Switzerland and elsewhere. Very early on she set herself the task of " painting her Bentham." This involved seeing *in situ* every species recognized as British, collecting it if allowable, and recording it by colouring the illustration in Fitch's or (later) in Butcher and Strudwick's *Illustrations*. The pursuit of this aim led her into almost every corner of the British Isles. Few of Miss Vachell's contemporaries can have obtained a better knowledge of British plants in their native habitats. At the end only thirteen species remained uncoloured in her copies of the works mentioned.

Miss Vachell's membership of the old B.E.C. dated from the day in 1916 on which its Hon. Secretary walked into the Vachell home in Cardiff announcing "I am Dr Druce." She became one of a band of loyal and enthusiastic friends of Dr Druce's, united in a common devotion to him and to British botany. Their trips to Scotland, Ireland, Teesdale, North Wales and elsewhere, were the forerunners of the more scientific though perhaps less spectacular annual excursions of later years. Miss Vachell herself wrote the accounts of three of these trips which afterwards appeared in the *Report*, viz. Jersey (1923) **7**, 245-9, North Wales (1924) **7**, 606-9, and Glamorgan (1927) **8**, 455-8. When the Society was democratised in 1932, Miss Vachell was one of the first members of the newly formed Committee and she continued to serve thereon except at short intervals until her death, being invariably re-elected after her statutory periods of retirement.

Miss Vachell inherited from her father a strong and abiding interest in her native county. This expressed itself in and through, among other ways, support of the Cardiff Naturalists' Society and its activities. She was from 1903 and jointly at first with Dr Vachell, Hon. Secretary of the Committee responsible for the preparation of the *Flora of Glamorgan*, the first volume of which was later published under the editorship of A. H. Trow, and she acted as Recorder therefor for the remainder of her life. She summarized her intimate and peculiar knowledge of this subject in articles published in 1933 (A List of Glamorgan Plants, *Rep. B.E.C.* **10**, 686-743), and 1936 (*Glamorgan County History*, **1**, ed. W. M. Tattersall, Cardiff, pp. 123-178), and contributed supplementary notes thereon to the *Transactions of the Cardiff Naturalists' Society* (1936, **69**; 1941-7, **71-78**). She was instrumental with Dr K. B. Blackburn in discovering the hybrid *Limosella aquatica* × *subulata* (1939, *J. Bot.*, **77**, 65-71; and 1941, *Trans. C.N.S.*, **71**, 32-35) and published an article on the leek as the national emblem of Wales (1919, *Trans. C.N.S.*, **52**). It was fitting that Miss Vachell who had done so much for the Cardiff Naturalists' Society should have become, as she did, the first, and has remained the only, woman to become its President.

She did much to popularise the pursuit of field botany. Every week for over 27 years from 1921 onwards she contributed a note on wild flowers to the *Western Mail*, the last such item being dictated from her death bed. She was always ready to lecture to societies, and broadcast many times from Cardiff when this was the home of West Regional. In later years she was always most anxious to help and encourage young botanists and she watched their progress with the utmost interest. She was most generous in sharing her knowledge with others.

Miss Vachell was a keen churchwoman and an enthusiastic supporter of the British Red Cross Society, of which she was later a Commandant and finally a Vice-President. During the First World War she worked as a part-time V.A.D. at the 3rd Western General Hospital throughout its existence. During the Second World War she again set aside her beloved hobby in order to devote herself to war work, becoming Deputy Chairman of the Women's Land Army for the County of Glamorgan and

acting as visiting Representative of the organization; she was also in charge of the library at the Ministry of Pensions Hospital, Rookwood, Llandaff. She was a member of the Court of Governors of the National Museum of Wales from 1919 and of its Council from 1925, and served on several of its Committees, being twice Chairman of the Science Committee. She was elected a Fellow of the Linnean Society in 1917. In whatever capacity she acted she contributed of her best. Her loyalty once given, whether to a person, a society, or a cause, was absolute.

Miss Vachell died on 6th December 1948. She bequeathed to the National Museum of Wales the Herbarium which had been formed by the late Dr C. T. Vachell and herself and which is to be known as the C. T. and E. Vachell Herbarium, together with her botanical diary and notes, and other botanical books and records, and she also gave the sum of five hundred pounds for the upkeep of the herbarium and records referred to.

This notice incorporates one already accepted for publication in the Proceedings of the Linnean Society.

H. A. Hyde.

I should like to add a personal tribute to Miss Vachell who was always so generous in her help to me and other members of the Society.

It was typical of her anxiety not to risk spoiling the enjoyment of others that when I stayed with her at Cardiff at the end of August 1948, followed by a holiday in Gower a few days later (where we were accompanied by Mr D. McClintock), there was no mention of the malady which was so soon to bring her life to a close. The excursion was nearly at an end before casual mention of an appointment with a specialist shortly afterwards led us to suspect that she might be suffering from something more serious than a slight indisposition. Meanwhile she entered into all our plans with enthusiasm and braved rain and hard going which might have deterred many a younger lady. The discovery of *Aster Linosyris* and other interesting plants recorded from Glamorgan as found on this trip (see Plant Notes, *Watsonia*, **1** (4)), gave her great pleasure and are in no small degree due to her fortitude. She passed away just three months later.

Miss Vachell was one of the small coterie of enthusiasts closely associated with the late Dr Druce and had a sentimental as well as a very practical interest in our Society. In her we have lost one of our most popular and active members. The B.S.B.I. was represented at the funeral by Mr A. E. Wade, and a telegram of condolence was sent from the Hon. General Secretary to her sister.

J. E. Lousley.

Albert Wilson (1862-1949). By the death of Albert Wilson the Society has lost one of its oldest members and most able local botanists. With the almost unique distinction of being the author of one important county flora and joint author of another, he was accepted as the authority on a group of north-western counties. In each of these it will be exceptionally difficult to fill his place.

Wilson was born of Quaker parents at " Calder Mount " near Garstang, Lancashire, on October 12th, 1862, and educated at Quaker schools at Kendal and Hitchin. He first became interested in field botany in the early spring of 1876 and, encouraged by his parents, began to prepare a collection of dried plants. He left school in 1879 and was apprenticed by a firm of Pharmaceutical Chemists at Bradford. After studying for a year in London he passed the examinations of the Pharmaceutical Society in 1884. He then returned to Harrison, Parkinson & Co. of Bradford as an assistant, later becoming a partner in the firm.

Albert Wilson married in June 1890 and moved to Ilkley seven years later, travelling to and from business in Bradford each day until his retirement in 1912. He then removed to his mother's home at Garstang until 1916, when he moved to Bentham and two years later to Sedbergh. In 1924 he left Sedbergh for Ro Wen, near Conway, where he stayed until 1946. At the beginning of the following year he made his home with his son at Priest Hutton, near Carnforth, where he died, after a second attack of thrombosis, on May 15th, 1949.

Thirty-seven years of retirement in five widely scattered homes in excellent country provided almost ideal conditions for the careful investigations for which Wilson became well known. But it is unlikely that these conditions would have been used to such advantage without the knowledge and experience gained from his collaboration with J. A. Wheldon in earlier days while he was still preoccupied with the ties and anxieties of business life. It was in 1898 that he made the acquaintance of the friend with whom he was so closely associated in botanical affairs for so many years. Wheldon, like Wilson, was a Pharmacist, and from 1891 until 1921 was Dispenser to H.M. Prison, Liverpool. Only six months older, he was, at the time of their meeting, very much more experienced in botany. Already a contributor to the *Journal of Botany*, he encouraged Wilson to collaborate with him in a joint paper the following year (1899); and, as he was a contributor to the Botanical Exchange Club, it was doubtless his influence that led Wilson to join our Society and send specimens for exchange in 1899. No less than 19 papers of a high standard and the *Flora of West Lancashire* appeared under their joint names during the next 16 years. They spent their holidays together in Scotland, Westmorland and the Isle of Man, and made shorter excursions to districts nearer their homes. A common interest in bryophytes and lichens as well as phanerogams cemented their friendship, which lasted until Wheldon's death in 1924. There are few examples in the history of British field botany of two men being so closely associated for so long.

Wilson's botanical work also owed much to his interest in meteorology and photography. For 56 years he sent up records of rainfall to the British Rainfall organisation (now under the Meteorological Office) and he also kept daily records of temperature. He was keenly interested in the effect of weather on plant-life, and climate is very ably

recorded in both his county floras. He similarly combined his knowledge of meteorology and botany in his papers on *The Great Smoke Cloud of the North of England* (1900?) and the series on *Meteorology and Phenology* (1926-1938). His interest in photography was put to good use in the *Flora of West Lancashire*, which is illustrated with 15 of his own photographs. For the later book his son, Howard Wilson, provided most of the pictures. His father's enthusiasm for the possibilities of using the camera more extensively for recording features of plant-life encouraged me to start using it for this purpose shortly after a visit to North Wales in 1931.

Turning to his more important publications, the two vice-county Floras are marked by close similarity in the method of presentation of the material. *The Flora of West Lancashire* (1907), of which he was joint author with Wheldon, has been regarded as the first local flora on ecological lines; the classification of vegetation in the introduction was certainly longer and more competent than that in any earlier work. *The Flora of Westmorland* (1938), for which Wilson was solely responsible, shows evidence of less thorough investigation of the vegetation of the area described. Both included Bryophytes and Lichens which reduced the space available for adequate treatment of the higher plants; both are characterised by unusual attention to altitude range and statements on habitat based on local rather than general observations. To produce such a volume at the age of 76 was a great achievement.

The Altitudinal Range of British Plants (1931), with its supplement (1940), was an important contribution to British Botany. Many of the entries were based on observations made by the writer and were greatly needed in a subject which had been somewhat neglected since the days of H. C. Watson and J. G. Baker. Wilson's book was the source for many of the entries on altitudinal range in Druce's *Comital Flora*. He added a few additional altitude records in his *Flora of a Portion of North-East Caernarvonshire* (1946-8) which is an account of a neglected, and not exceptionally productive area west of the Conway, written shortly before his death.

Wilson was a member of this Society from 1899 until his death and contributed regularly for many years to the Exchange Club. His specimens were well selected and carefully dried and the labels neat and informative. A particularly useful contribution was ×*Potamogeton Griffithii* A. Benn. from Llyn Anafon (*B.E.C. 1928 Rep.*, 928-929, 1929), which was to be destroyed shortly after by conversion of the lake into a reservoir. To obtain his gathering Wilson carried a garden rake across the moorland. He was a Fellow of the Linnean Society from 1900 until his death, and a Fellow of the Royal Meteorological Society over a long period.

Albert Wilson was quiet, conscientious, perhaps a little reserved, but extremely kindly and most anxious to give every possible help to fellow botanists. He was an excellent walker and especially so on hills,

as I found to my discomfort on one hot June day we spent together on the Great Orme. When nearly 85 years of age he climbed to the summit of Ingleborough. He was a punctilious correspondent and his letters written in a beautiful round hand were a joy to read.

He presented his herbarium to the Yorkshire Museum, York, and leaves a brother and a son (Mr Howard Wilson), who assisted him in his later botanical work and to whom I am indebted for personal information incorporated in this appreciation. To them many members will wish to join in sending our deepest sympathy in their loss. A portrait of Albert Wilson working in his study appeared in his *Flora of Westmorland* (opposite p. 402). It is in accordance with his modesty that it is tucked away at the end of the book without mention in the list of illustrations. He was the last surviving member of the Botanical Record Club—an organisation which came to an end over sixty years ago.

In the compilation of the following list no search has been made of periodicals of local Natural History Societies. Some of the parts cited may have been issued after the ends of the years stated. An asterisk before the title indicates that the paper or book was written jointly with J. A. Wheldon. (s.n.) = short note.

1883 : West Lancaster : A Catalogue of species . . . . observed in 1881-82; *Botanical Record Club Report for 1881 and 1882*, 248-249. (Other records in this and subsequent Reports of this Club).
1887 : Record of Cirsium acaule ex Lees, F. A., *Naturalist* for **1887**. 273.
1899 : *The Mosses of West Lancashire, *J. Bot.*, **37**, 465-473, 509-518.
1899—> : Records in *B.E.C. Reports*.
1900 : *Additions to the Flora of West Lancashire, *J. Bot.*, **38**, 40-47.
1900 : In Lees, F. A., West Lancaster Indigenes, *Naturalist* (516), 3-4.
1901 : *Additions to the Flora of West Lancashire, *J. Bot.*, **39**, 22-26.
1901 : *Mosses of West Lancashire, *J. Bot.*, **39**, 294-299.
1901 : *Notes on the Flora of Over Wyresdale, *Naturalist* (539), 357-362.
1902 : *West Lancashire Plants, *J. Bot.*, **40**, 346-350.
1902 : *Additional West Lancashire Mosses and Hepatics, *J. Bot.*, **40**. 412-416.
1902 : *Alchemilla vulgaris L. var. filicaulis (Buser) in West Lancashire, *J. Bot.*, **40**, 392. (s.n.)
1902 : Menyanthes trifoliata at an Unusually High Elevation, *Naturalist* (550), 352. (s.n.)
1903 : *Kantia submersa in Britain, *J. Bot.*, **41**, 17-18.
1903 : *Kantia submersa : a new British Hepatic, *Naturalist* (553), 63.
1904 : *West Lancashire Lichens, *J. Bot.*, **42**, 255-261.
1905 : *Additions to the West Lancashire Flora, *J. Bot.*, **43**. 94-96.
1905 : Scirpus sylvaticus in Lake Lancashire, *J. Bot.*, **43**, 243. (s.n.)
1906 : *Additions to the Flora of West Lancashire, *J. Bot.*, **44**, 99-102.
1907 : **The Flora of West Lancashire*, pp. 512, with map and 15 illustrations from photographs by A. Wilson; Henry Young & Sons, Liverpool.
1908 : *Inverness-shire Cryptogams, *J. Bot.*, **46**, 347-356.
1909 : *Lycopodium annotinum in Westmorland, *J. Bot.*, **47**, 74-75. (s.n.)
1909 : *Gyrophora spodochroa Ach., *J. Bot.*, **47**, 431, 447-448. (s.nn.)
1910 : *Inverness and Banff Cryptogams, *J. Bot.*, **48**, 123-129.
1910 : *West Lancashire Mosses, *J. Bot.*, **48**, 111. (s.n.)
1913 : *West Lancashire Extinctions [Cockerham Moss], *J. Bot.*, **51**. 336. (s.n.)
1913 : On Gathering, Growing and Preparing Mosses for the Herbarium, *Naturalist* (674), 128-130.

1914 : *Alpine Vegetation on Ben-y-Gloe, Perthshire. *J. Bot.*, **52**, 227-235 (with correction on p. 277).
1915 : *The Lichens of Perthshire, *J. Bot.*, **53**. Suppl. 1. 1-74.
1918 : Malaxis paludosa (Sw.) and Salix herbacea (L.) in North-west Yorks., *Naturalist* (741), 335. (s.n.)
1919 : West Yorkshire Botanical Notes, *Naturalist* (754), 369.
1922 : West Yorkshire Botanical Notes, *Naturalist* (791), 397-398.
1924 : West Yorkshire Botanical Notes, *Naturalist* (805), 48-50.
1926-1938 : Meteorology and Phenology (Quarterly notes with many personal observations), *N.W.Nat.*, **1-13**.
1927 : Stachys alpina L. in North Wales, *N.W.Nat.*, **2**, 181-182.
1927 : Denbighshire Hepatics, *N.W.Nat.*, **2**, 182. (s.n.)
1927 : Wasps at a High Altitude (with H. Wilson), *N.W.Nat.*, **2**, 255. (s.n.)
1929 : Notes on the Flora of Carnedd Llewellyn, *N.W.Nat.*, **4**, 53-56.
1930 : Asplenium septentrionale in Wales, *N.W.Nat.*, **5**, 252. (s.n.)
1930-1931 : The Altitudinal Range of British Plants, *N.W.Nat.*, **5** & **6**. Supplement, 1-105; [reissued by T. Buncle & Co. Ltd., Arbroath].
1930 : Census Catalogue of British Hepatics (review), *N.W.Nat.*, **5**, 281-282.
1932 : Tilia cordata in Caernarvonshire, *N.W.Nat.*, **7**, 318. (s.n.)
1933 : Flora of Westmorland, *N.W.Nat.*, **8**, 52-53.
1933 : Westmorland Mosses, *N.W.Nat.*, **8**, 54. (s.n.)
1933 : Juncus macer in Caernarvonshire, *N.W.Nat.*, **8**, 328. (s.n.)
1933 : Yorkshire Naturalists' Union Circular No. 368 : The 368th Meeting at Sedbergh, *Naturalist* for 1932, Supplement.
1935 : Tomatillo (Physalis ixocarpa Brot.), *N.W.Nat.*, **10**, 359. (s.n.)
1936 : Westmorland Hepaticae, *N.W.Nat.*, **11**, 164-165. (s.n.)
1936 : A Large Evergreen Oak, *N.W.Nat.*, **11**, 359-360. (s.n.)
1936 : Poa Chaixii in Caernarvonshire, *N.W.Nat.*, **11**, 363. (s.n.)
1938 : *The Flora of Westmorland*; pp. 413, with map and 37 reproductions from photographs by Howard Wilson, etc.; printed by T. Buncle & Co. Ltd., Arbroath, and published privately.
1939 : The Aurora Borealis of February 24th, 1939, *N.W.Nat.*, **14**, 40. (s.n.)
1940 : Further Notes on the Altitudinal Range of British Plants, *N.W.Nat.*, **15**, 41-50
1940 : Some Plants of Anglesey, *N.W.Nat.*, **15**, 104-109.
1940 : The Arctic Spell of Weather in January 1940, *N.W.Nat.*, **15**, 219-223.
1946-1948 : The Flora of a Portion of North-East Caernarvonshire, *N.W.Nat.*, **21**, 202-223; **22**, 62-83, 191-211.

In addition, he wrote a paper on "The Great Smoke Cloud of the North of England and its Influence on Plants," *Halifax Naturalist* (as read before the British Association Meeting, 1900), which is cited in *Fl. W. Lancs.*, 124, and *Fl. Westmorland*, 55, and which I have not seen.

J. E. Lousley.

Anthony Hurt Wolley-Dod (1861-1948) was born on 17th November 1861 at Eton College. He was the fourth son of the Rev. Charles Wolley-Dod, an assistant master at the College. Educated at Eton, he went to the Royal Military Academy at Woolwich in 1879, and from there obtained a commission in the Royal Artillery on 23rd February 1881. From 1881 to 1886 he served at Gibraltar, and in March 1886 went into the Advanced Class at the Artillery College till February 1888, when he entered the Inspection Department of Warlike Stores at Woolwich Arsenal, being promoted Captain in 1889 and remaining there until 1896. He served as Assistant Inspector in the Ordnance Department in South

Africa from 1896 to 1898, returning to the Inspection Department at Woolwich until 1901, when he retired from the Army with the rank of Major and became Artillery Adviser to Hadfield's Steel Foundry until 1910. He made two visits to Gibraltar, both from November to June inclusive, between 1911 and 1913, when he was able to devote practically the whole time to the study of the botany of the Rock and the adjacent portion of Spain. During the 1914-18 War he returned to the Inspection Department at Woolwich, obtaining the brevet of Lieutenant-Colonel and retiring again in 1919. In 1920 he visited his brother-in-law in California for reasons of health, returning within a year. He died on 21st June 1948, having been ill for several years at his home in Mayfield, Sussex. He was twice married, first to Agnes Gardyne Mackintosh, who died in 1917, by whom he had a daughter, and in 1922 to Eileen Griffin, who survives him.

He had a general interest in Natural History, but his chief interest was in plants, especially in Roses, of which he became the acknowledged British expert. He parted with his Rose collection to the Natural History Museum in 1938, the rest of his herbarium following it at his death.

Most of his botanical writings appeared in the *Journal of Botany*, his first dealing with plants observed near Woolwich (1892, **30**, 121 : 370, aliens). In a letter dated 16th Sept. 1892, F. Townsend asks W. H. Beeby if he can look over some specimens which Wolley-Dod had sent him, as he was going to Scotland and could not attend to them, and refers to Wolley-Dod as " an ardent young botanist, sagacious and very painstaking, sparing himself no trouble and deserving of help." Further short Kent notes followed (1893, **31**, 153, *Lonicera Caprifolium* in West Kent; 1894, **32**, 87; 1895, **33**, 84, *Glyceria distans* var. *pseudo-procumbens*, var. nov.; 185, monoecious *Mercurialis perennis*), and two on plants found in Cheshire (1893, **31**, 372). In 1898 (**36**, 352) he recorded *Gymnadenia albida* × *conopsea* from Scotland (near Arisaig). In 1899 he made his first contributions to the two Exchange Clubs, and he acted as Distributor for the Watson Club in 1901-2.

His sojourn in South Africa produced two papers in which new plants from the Cape were described (1900, **38**, 170-1; 1901, **39**, 379-402), and he collaborated with H. Bolus in the production of *A List of the Flowering Plants and Ferns of the Cape Peninsula, with notes on some of the critical species* (1903).

By 1906 he had become well acquainted with both *Rubus* and *Rosa*, for in that year (**44**, 63-65) he described a new species and variety of *Rubus* (*R. castrensis* and *R. rhombifolius* var. *megastachys*), and first acted as a critic of Roses sent to the Watson Club, a task which he continued until that Club ended in 1934. His first contribution to the B.E.C. in 1899 included Roses, and his criticisms of Roses sent to that Club began in its *1901 Report*. In 1906 also we find him reviewing a book for the editor of the *Journal of Botany* (**44**, 430), but his preoccupation was by now Roses, and his work resulted in two Supplements to the

Journal, the first, in 1908, dealing with the Subsection *Eucaninae* (see also a note on *R. obovata* Ley on p. 364) and the second in 1910 with the remainder of the genus. A further Supplement in 1911 provided *A List of British Roses*, which included an analytical key for identification. Notes on how good specimens of Roses should be collected appeared in 1909 (**47**, 247-255, with notes on identification), 1920 (**58**, 23-24), 1924 (**62**, 52-53, with remarks on reference numbers) and 1927 (**65**, 84). He was a good collector himself, and liked to receive equally good specimens when asked for identifications.

During his two seasons at Gibraltar he made fine collections in duplicate so that one series might remain in the Museum at Gibraltar. The first year he presented the other to the Natural History Museum, the second year to Kew, with additions to the N.H.M. collection. He found the neighbourhood "considerably richer than is indicated by the Floras hitherto published," and prepared a *Flora of Gibraltar and Neighbourhood*, an excellent piece of work which appeared as a Supplement to the *Journal of Botany* in 1914, several new species and varieties having been previously published (1914, **52**, 16-15, 47).

For the next few years his only note concerned the finding of *Juncus tenuis* in Carnarvonshire (1916, **54**, 88), but in 1920 *A revised Arrangement of British Roses* formed another Supplement to the *Journal of Botany*.

During his visit to California he collected over 450 specimens* (presented to the Natural History Museum in 1925), and prepared a paper on "The Flora of the Santa Cruz Hills," proof of which, set up by Taylor and Francis dated 17th April 1923 (about 20 pages) exists in the library of the Natural History Museum. Except for the reader's corrections on the top of three copies, the proof is untouched, and I have been unable to discover why it has since remained in that condition. He had reviewed a *Report on the boreal Flora of the Sierra Nevada of California* in 1922 (**60**, 90-91).

He returned to Roses with *The Roses of Britain*, published by Taylor and Francis (reviewed in *J. Bot.* by Matthews, **62**, 354), some novelties having first appeared in 1921 (**59**, 178, *R. rubiginosa* × *spinosissima* forma *cantiana*) and 1924 (**62**, 202-209). In 1931 his last *Revision of the British Roses* appeared as yet another *J. Bot.* Supplement, which had been preceded by notes on *R. hibernica* Templ. (1928, **66**, 361-2), "Some varieties of *Rosa tomentosa*" (1929, **67**, 38-42, 87), and *Rosa scabriuscula* Smith (1930, **68**, 185-187).

For the next few years a new interest entered his life. In 1927 Dr Rendle, in his Presidential Address to the South-Eastern Union of Scientific Societies at Hastings, suggested that the local Natural History Societies might work towards the production of an up-to-date Flora of Sussex, and in 1930 Wolley-Dod was invited to undertake the task

*In the Herbarium at Kew there are specimens belonging to various families collected by Wolley-Dod stamped "Received March 13, 1922." In addition he presented "over 200 grasses collected by him in California"—see *Kew Bulletin*, **1923**, 62.—J. E. Lousley.

of editing such a Flora, an invitation which he accepted. The large amount of work which such an undertaking involves was brought to a successful conclusion in 1937. The various MSS. concerning this Flora he deposited in the Natural History Museum. A note on " The Markwick Papers " connected with it appeared in 1933 (**71**, 348-351). During this last period he reviewed Keller's *Synopsis Rosarum . . . Europae Mediae* (1932, **70**, 114-116) and Boulenger's *Les Roses d'Europe* (the only two volumes which appeared) (1933, **71**, 108-110).

By the time the *Flora of Sussex* was completed he was 75 years of age, and although he tried to bring the nomenclature of British Roses into line with changing Continental views, no further paper was published. In his work on Roses he relied considerably on Crépin until that botanist's death, and later obtained determinations from Sudre and Dingler, but with them he often found himself in disagreement, as his herbarium notes show. In his later years he was, not unnaturally, unable to follow up the developments arising from increasing knowledge of the peculiar cytology of the genus, which have thrown new light into the tangle which is still far from being unravelled. He spent his remaining years on his other hobby, gardening, until his increasing frailty put an end to such activity.

As a man I found him quiet and reserved, a voluminous botanical correspondent, always willing to give others the benefit of his knowledge and experience. He gave great help to the Wild Flower Society, where it was much appreciated (*Wild Flower Magazine, Sept.-Dec. 1948*, 220).

A. J. WILMOTT.

REVIEWS

Drawings of British Plants. Stella Ross-Craig. Part III: Cruciferae; 77 plates. 1949. London: G. Bell & Sons, Ltd.; 9/- net.

The third volume of Miss Ross-Craig's *Drawings of British Plants* is devoted to the *Cruciferae*—a family which, judged at any rate by its British representatives, must surely be ranked among the less attractive. Such genera as *Barbarea*, *Sisymbrium* or *Brassica* provide, at the best of times, somewhat uninspiring material for the draughtsman's art; and when the artist aims also to compress, into an area of barely eight inches by five, not only a life-size portrait of each species, but also numerous magnified drawings of flowers, fruits and other morphologically or diagnostically important parts, the difficulties to be surmounted become truly formidable. It is, as a matter of fact, open to question whether such rigorous compression is really necessary: these volumes in their present form seem to me to fall needlessly between two stools. They are not, nor with their avowed objectives could they possibly be, small enough to be conveniently carried on excursions into the field; and so, their place being in the library, it would appear that they might with advantage have been considerably larger. None the less, assuming that there is indeed some good reason for the present size, Miss Ross-Craig deserves our warmest congratulations and thanks for the determination and skill with which she has set about her task. She has given us, in this third volume as in the first two, what are, in my opinion, at once the most useful and, for the most part at least, the most aesthetically satisfying drawings of British plants that have yet been published. When the complete work is available, it will be an invaluable addition to the libraries, not only of those teachers and students for whom it is especially intended, but also—and perhaps even more so—of those amateurs who, like myself, have never yet had the good fortune (or maybe the initiative) to attend a botany class.

Anybody who attempts to review a publication such as this is almost bound to do so, I suspect, from a largely subjective standpoint. When he looks critically at a drawing of a plant, he tends to compare that drawing, not with a living specimen—not, at any rate, in the depths of winter—but either with a herbarium sheet, which is certainly a false criterion, or simply with his own mental picture of the plant, which may or may not be tolerably accurate. It is perhaps relevant to say, before I embark on a number of tentative comments, that I am writing at a season when fresh specimens are not to be found and in a place far distant from a herbarium. So fully am I aware that my impressions, with one exception, are subjective, that I shall not be in the least surprised if the next botanist with whom I discuss the work disagrees with them all.

There is, however, one objective criticism—the exception just mentioned—which can, I think, be fairly levelled at the present volume. The British *Cruciferae*, like all too many other families, present certain taxonomic problems which are as yet by no means finally solved. It is of course true that the form and purpose of Miss Ross-Craig's work compel her, first, to reach a conclusion on such problems, and then, however tentative that conclusion may be in her own mind, to present it to others in a dogmatic manner. But even so it comes as something of a surprise, to me at least, to find on Plate 33 the legend "*Cochlearia alpina* (Bab.) Wats. (syn. *C. micacea* E. S. Marshall, ? *C. scotica* Druce)." It may be, I suppose, that recent work on the British Cochlearias has led to the conclusion that there is no valid distinction between *C. alpina* and *C. micacea*; but since the opinion is still widespread that these two —to say nothing of the plant of the far northern coasts—are separable species, it does seem to me that a brief note, or possibly, if some pronouncement on the subject is already accessible, merely a reference, either at the bottom of the page or in the Introduction, would be a great assistance. Again, when *Brassicella monensis* (L.) O. E. Schulz and *B. Wrightii* O. E. Schulz are both very properly included, the omission of *B. Erucastrum* (L.) O. E. Schulz seems to call for a word of justification. Are we to assume that Miss Ross-Craig does not regard *B. Erucastrum* as specifically distinct? Have the complexities of nomenclature led to some confusion with *Erucastrum gallicum* (Willd.) O. E. Schulz? Or is it simply excluded on the quite different but surely erroneous ground that it is only a casual? None of these explanations seems very plausible; and yet one of the three, I take it, must contain the answer. I would most strongly urge that in each future volume of the series there should be included, either as well as or, preferably, in place of the general Introduction, a particular introduction dealing very briefly with such taxonomic questions as the volume raises. Otherwise there will surely be many others besides myself who, even if they agree with the conclusions presented, will still feel slightly frustrated at the total absence of explanation of how those conclusions were reached.

A somewhat similar objection—though one, I admit, that probably falls into the subjective class—might be raised against the inclusion of certain dubiously British species to the exclusion of certain others. "No casuals are illustrated," says Miss Ross-Craig in the Introduction, "nor escapes from cultivation which are of extremely limited distribution, such as *Paeonia mascula* Mill. and *Corydalis lutea* (L.) DC."; and though, a few lines lower down, she adds that "there may, however, be occasional departures from the plan outlined above," yet even so, if no further explanation of such "occasional departures" is forthcoming, then they are likely to strike many who use the book, as in fact they strike me, as somewhat arbitrary. My own very slight acquaintance with, for instance, *Conringia orientalis* (L.) Dum. in Britain would lead me to conclude, though very probably wrongly, that in these days at least it is the merest casual; while, as an inhabitant of Cambridge, I

would certainly have described *Arabis Turrita* L. as both an "escape from cultivation" and "of extremely limited distribution." When, therefore, I find these two plants included, I begin to wonder whether there are not many others whose claim to inclusion, though rejected by Miss Ross-Craig, is at least as strong. But then, since every field-botanist's notion of what should be included in a Flora of Britain inevitably varies according to his personal experience, this criticism has, probably, little or no weight.

So much for the form and content of the book. As for the drawings themselves, which are after all infinitely the most important part of the book, I have little to offer but unqualified approval. Almost all the life-size drawings are not only very faithful but also beautifully designed; and two in particular, those of the two recently separated species of *Nasturtium*, seem to me to call for a special word of gratitude. In one instance only Miss Ross-Craig shows that she is not wholly immune to that commonest of all faults in plant drawings, the tendency to unnatural stiffness: *Arabis alpina* L., as it grows in the Cuillins, has usually a distinctly flexuous stem. In a few other cases—*Arabis Brournii* Jord., for instance, or *Alyssum alyssoides* (L.) L. (and incidentally the representation of the latter strikes me as on other grounds the least convincing in the volume)—an undue emphasis seems, at first sight at least, to be laid on the hairiness of the plant. But this impression of exaggeration is no doubt due to the simple fact that, whereas the hairs are actually silver or white, they can only be reproduced in ink as black; and such a defect, being inherent in the medium, can probably only be avoided at the cost of falsification. In any case there are but few instances where it obtrudes. Far more often was I impressed by the remarkable skill with which, in these life-size portraits, Miss Ross-Craig had succeeded in putting upon paper the very feel of the plants portrayed.

The magnified drawings of the various parts of the plant are equally skilful, and often also they are of the utmost interest. There can hardly be a botanist in the country who would not find something in these magnified drawings that he had never noticed before. Usually, too, they are grouped with great artistry upon the page. There are admittedly a few plates—1, for example, and 72—where the available space seems rather overcrowded; and occasionally, as on plates 21 and 64, the surround of magnified parts distracts attention from the principal drawing in the middle. In such cases I personally believe that, if a few of the less important parts could be omitted, the loss would be more than outweighed by the consequent gain in artistic merit. At all events there is no doubt that it is the lighter and more spacious plates—19, for instance, or 57—that produce the most attractive effect. But here, of course, even more than elsewhere, I speak not as a teacher or student of botany but as an amateur.

Incidentally, I have noticed two very trivial errors—the equivalent of misprints—in connection with these magnified drawings. On plate 1,

if it be true that the part of the leaf (C) is magnified by 12, then surely the hairs from the leaf (D) must be magnified by much more than 16. And on plate 43 we are not told—though we may perhaps succeed in guessing!—what K represents.

Very much the least successful part of Miss Ross-Craig's work is, to my mind, the small-scale drawings of complete plants. I have little doubt—especially since a large proportion of these drawings give the plant too strict and attenuated a habit—that this is due largely to the limitations of space; though I can but wonder also whether in some such cases Miss Ross-Craig has not been content to work from pressed rather than from living material. But, be that as it may, there are several instances—notably, perhaps, plates 1, 2, 36 and 50—where I should have been happier if these small-scale drawings had been omitted. I fully appreciate, of course, the importance to the beginner of a drawing of the whole plant; but unless such a drawing can be executed with the same admirable fidelity as characterizes the rest of Miss Ross-Craig's work, then here again I wonder whether its omission, by enabling the artist to lighten the page, would not eventually be more than offset by the incidental gain.

But even those, if any, who would endorse each one of my criticisms will agree that the sum of these deficiencies, when set against the many great merits of Miss Ross-Craig's work, amounts to very little. *Drawings of British Plants* will justly be in great demand, and they will undoubtedly stimulate yet further the already rapidly increasing interest in, and knowledge of, the British flora. It is a pity that, having so far reached only the end of the *Cruciferae*, the published parts of the work already cost almost £1; the complete work, even without binding cases, will presumably cost little under £12. Swayed by such considerations I originally decided that, as I could not afford the whole, I had better not start buying parts; and there may, I fear, be many others who are likewise discouraged. But for my own part I have now, after a detailed scrutiny of the third volume, been so impressed by the excellence and usefulness of Miss Ross-Craig's drawings that I have speedily relented and ordered the first two parts as well. And I look forward eagerly to the publication of the rest.

J. E. RAVEN.

British Plant Life. W. B. TURRILL, D.Sc. (Lond.), F.L.S. Pp. 315 with 53 colour plates and 27 black and white photographs, 8 distribution maps and 2 diagrams. London: Collins (The New Naturalist: 10), 1948; 21/- net [8½″ × 5¾″; cloth].

This book attempts to put before the general public certain aspects of the study of British plants which are not usually considered "popular." It is, perhaps, the first such attempt, since all previous popular books on British plants may be classed under three headings—taxonomic, aesthetic, nature study.

After two prefaces and an introduction, the author starts by giving a possible theory of the origin of life and a brief account of the fossil floras up to the Ice Age. These chapters seem too brief to be of much value and might, perhaps, have been omitted without anything being lost, leaving more space available for other aspects. The next two chapters deal with the Ice Age and Post-Glacial changes, some knowledge of which is essential for an understanding of the British Flora.

Chapter 6 deals with the Present Composition of the British Flora, firstly from the point of view of the number of species in different groups, and, secondly, from that of the Watsonian distribution types (it seems a pity that Watson's types were not adhered to and that the complication of sub-types was introduced).

The next chapter continues this with an account of the relationships of our Flora with other parts of the world (especially Europe). The grouping used is not quite that of Salisbury or Matthews and is, perhaps, preferable to either. It is, however, a pity that the so-called Steppe Plants are maintained as a separate group since it seems doubtful whether we have any true Steppe Plants in Britain. The "Arctic-Alpine" group, also, most of which occur in northern Asia and America as well as in Europe, seems misplaced as a sub-group of "General European Species." It is good to see Group 8—"species whose centre of distribution is the British Isles"—recognised as distinct, but would not *Oenanthe fluviatilis* be an even better example than *Spartina Townsendii*, whose range in the near future is unpredictable?

The next two chapters (55 pages) are on Ecology—the first concerned with habitat factors, the second with plant communities. The latter are grouped according to facies and little explanation of succession is attempted. This course seems the only possible one in the space available, but could not rather more space have been given to the subject? I should like to mention especially the author's plea for a careful investigation of ruderals and aliens. The author singles out *Veronica filiformis* for special mention though its spread is likely to be very different from that of *V. persica* with which he suggests it should be compared. *V. filiformis* is a perennial, does not grow on arable land and apparently never produces seed in this country whereas *V. persica* is an annual weed. *V. filiformis* is certainly well worth study especially as it is a comparative newcomer, so are such plants as *Buddleia Davidii* and *Epilobium pedunculare*, both also fairly recent naturalisations. It is to be hoped that these and any other plants that show signs of spreading will receive early study; we are too ignorant of the spread of such plants as *Rhododendron ponticum* and *Calystegia silvestris*, both now common in many places.

Almost all the remainder (116 pages) of the book is devoted to a study of variation, in a wide sense, and more especially of heredity. It is in these chapters that Dr Turrill's special knowledge shows to best advantage and which are, to my mind, the most interesting part of the book. The first chapter on "Variation" discussed the various

kinds that occur and their causes. The next, "Adaptation and Natural Selection," is given a very wide scope and includes such subjects as Halophytes, Mycorrhiza, Parasites, Pollination Mechanisms, Seed Dispersal, Germination, Ecotypes, etc., all in 45 pages and without leaving a feeling that more need have been said. There follows a chapter on the Study of Heredity consisting of examples of results of various genetical and cytological researches on various British plants. The examples are admirably chosen to cover a wide range from simple genetics such as *Senecio vulgaris* to the reduction division in *Rosa* and the *Salix* hybrids. The accounts given of *Silene*, *Saxifraga*, *Centaurea*, *Taraxacum*, etc., largely based on Dr Turrill's own work, show how well qualified he is to write on this subject.

"Continuing changes in British Plant Life" includes both ecology and evolution, the main text concluding with suggestions for further work and a passage on Nature Reserves.

Maps illustrating the Watsonian distribution types follow, and then six appendices on methods of study, elements of genetics and cytology and a short list of County Floras of which one or two such as Druce's of West Ross and of Zetland and Babington's of Cambridgeshire—still better than Evans'—are strangely omitted. The appendices, especially those on genetics and cytology, are perhaps rather too condensed and we are given new numbers for the Irish vice-counties, an innovation—due apparently to the editors and not to the author—to be deplored.

A list of references, a glossary and an index concludes the book.

As seems inevitable with coloured photographs, the plates are uneven and, as seems usual in this series, the close-ups are much better than the vegetation pictures (Box Hill, Pl. 28, looks like a Mediterranean scene). The plate that pleased me most was that of the two Oaks (Pl. 20); I have never seen an illustration of them which brings out their differences so well. Others which may be especially praised are *Tamus* (3), *Lathraea* (21), *Ajuga Chamaepitys* (39) and *Myosotis alpestris* (8).

There are few errors, but *Nyssa* (p. 34) is not a Palm nor have I ever seen *Linum catharticum* (p. 45) on cultivated or waste ground. *Lobelia Dortmanna* (p. 54) belongs to Watson's Scottish, not Intermediate, type and there is a curious misprint on p. 62 where *Arabis stricta* is called "British" instead of "Bristol" rock-cress.

There is, as is to be expected, scope for difference of opinion, and there are a number of statements which may mislead. *Scrophularia aquatica* (p. 60) is not—except in a very wide view of the species—a "widely distributed species" but is a West European one; *Carex Grahami* and *Primula scotica* are endemic and should not be called "Arctic and Sub-Arctic," even though their near relatives may be such. *Trientalis* and *Pyrola* spp. (p. 103) are, in the main, woodland species, though they sometimes occur on moors. Plate 23 is clearly the hybrid with *Crataegus monogyna* and not *Crataegus oxyacanthoides* itself. Primary *Sorbus* hybrids (p. 107) are undoubtedly rare and the

majority of local *Sorbi* are microspecies, though some are probably of hybrid origin; the author's contrast here is a false one. *Populus tremula* (p. 108) is surely native. *Salix aurita* must be extremely rare in oakwoods, and the typical woodland hawthorn is *Crataegus oxyacanthoides* (p. 110). Neither the Beech nor the Dog's Mercury (p. 151) can fairly be called calcicoles, as Dr Turrill himself shows for the former (p. 106).

These are, however, minor faults and the book as a whole is worthy of high praise. It should be possessed by all who have an interest in the British Flora. To those who hitherto have only been interested in "wild flowers" it will be a revelation and will give them an insight into the scientific aspects of the subject; for all of us it will contain information and ideas that are new.

One final criticism—I am left wondering if too much has not been attempted. The early chapters contain much that will interest those without botanical training but little that is new for the experienced botanist or botanical student. The later chapters will be valuable for the latter, but may they not be too difficult for the former? There is almost too much information. It might have been preferable to have made two books, one for the historical and ecological aspects and one for the evolutionary and genetical ones. This would have allowed for more explanation and longer descriptions which, in the ecological section (in particular, beechwoods), are sometimes so short as to be misleading.

E. F. Warburg.

A Record Book of the British Flora. A list compiled by Geo. Hazzard. Pp. 144. Ashford, Kent: L. Reeve & Co. Ltd., 1949; 7/6 net [7¼″ × 4¾″; cloth].

A Nature Record Arranged for Five Years. Compiled by Brian R. Harrison. Pp. 96. Ashford, Kent: L. Reeve & Co. Ltd., 1949; 7/6 net [8½″ × 5½″; cloth].

These two little books are of a similar character; both are designed to enable the user to record his own observations, for which spaces are provided. They will doubtless prove useful for those who like to keep their observations in this form and who like to be guided as to what to record.

The first, concerned entirely with plants and apparently mainly intended for schoolchildren, purports to give a list of those species figured in Fitch & Smith's *Illustrations of the British Flora* and Butcher & Strudwick's *Further Illustrations of British Plants.* Species are provided under each plant for "Date identified." with separate spaces for "Day" and "Month" in "Leaf," "Flower" and "Fruit" and *one* column only for "Station where the plant was first found." Nothing for habitat, and the space for the station is only one and a quarter inches (although the dates have two and a half inches) and with no

room for two lines of writing! Furthermore, I have found over 75 scientific names wrongly spelled—not including cases where capital letters have been used instead of small ones and *vice versa*, of which there are over 50; this is inexcusable in a compilation of this kind. Nor has the compilation been intelligently done; for example: we are given 486. *Valeriana officinalis* (from Fitch & Smith) followed by 213. *Valeriana officinalis* (from Butcher & Strudwick) but no explanation of Butcher's reason for figuring the plant again, namely, that he considered the earlier illustration to portray *V. sambucifolia*. I cannot recommend this book, though it has its virtues—good print, good binding and a convenient size for the pocket.

The second book is more attractive and perhaps more valuable though less concerned with Botany. Spaces are provided for weather records for each month and for recording "Flowers, Trees and Shrubs," "Butterflies, Insects, etc.," and "Birds Nests" or "Bird Song" with a space for the date (for plants, presumably, that of first flowering). Thirty-seven blank spaces for species are available for each group, each month. Between each monthly chart are pages of proverbial weather-lore for the month and lists of flowers, birds and insects to be expected.

E. F. WARBURG.

PUBLICATIONS

A revised list of publications available for sale may be obtained from the Hon. General Secretary. Orders should be sent to Mr J. H. BURNETT (address as inside front cover), and payment made on receipt of invoice.

BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

Members who expect to attend the meeting of the above Association to be held in Birmingham from August 30 to September 6, 1950, are asked to advise the Hon. General Secretary before July 30.

Instructions to Contributors.

PAPERS

are invited both from Members of the Society and others. They should have a bearing on the taxonomy or distribution of British Vascular Plants or Charophytes. Papers should preferably be typed, but clearly written MSS can be accepted. They should be double-spaced and written or typed on one side of the paper only. The form adopted in this part should be used for citations and references. Full references should be put at the end, except where special reasons exist (e.g., the citation of place of publication of a plant name) or in very short papers. Illustrations, which may take the form of line drawings or photographs, will be considered for publication. Twenty-five separates of each paper are given free to the author, and further copies may be obtained on payment; requests for extra copies should be made when proofs are returned. Papers should be sent to the Editor, Dr E. F. Warburg, Druce Herbarium, 9 Crick Road, Oxford.

PLANT RECORDS

Instructions are given in the Year Book, 1949. Records may be sent either to the Editor or to Mr E. C. Wallace, 2 Strathearn Road, Sutton, Surrey.

PLANT NOTES

Instructions are given in the Year Book, 1949. Notes should be sent to the Editor.

OBITUARIES

These should include date of birth and death, summary of life so far as events have a bearing on botanical work, whereabouts of herbarium and any manuscripts and chief botanical publications. Offers to write obituary notices may be sent either to the Editor or to Mr J. E. Lousley, 7 Penistone Road, Streatham Common, London, S.W.16.

BOOKS ON BOTANY AND ALLIED SUBJECTS.

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BRITISH FLOWERING PLANTS AND MODERN SYSTEMATIC METHODS

being the Report of the Conference on "The Study of Critical British Groups," arranged by the Society in 1948. Edited by A. J. Wilmott, pp. 102 + 18 half-tone plates, this book contains accounts of some of the latest work on British Flowering Plants.

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M.A., Ph.D.

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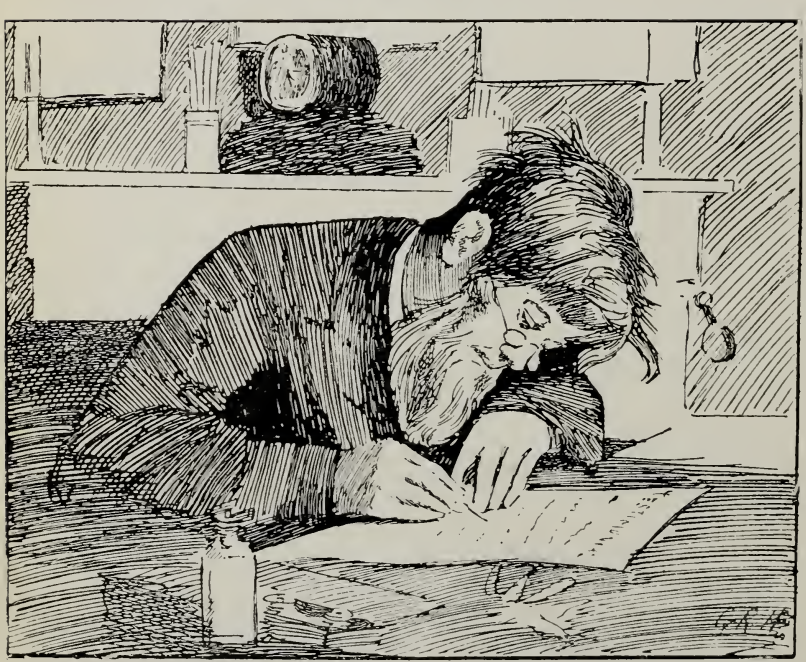
[Continued on Inside Back Cover]

From a painting by Joseph W. Forster.

JOHN GILBERT BAKER (1834-1920).



With acknowledgements to Pall Mall Budget, 1893

A Testimonial. "Two years ago I was induced to buy your lotion for the hair; since then I have been unable to wear a hat.'

From the Trower Fund.

THE E. G. BAKER BEQUEST

By J. E. Lousley.

Under the terms of the will of Mr Edmund Gilbert Baker the Society receives unconditionally the portrait of his father by Joseph W. Forster. This picture of John Gilbert Baker is one of the best known of any British botanist of the last century. It has been described by a contemporary writer as "an excellent and characteristic likeness" and was hung in the Royal Academy in 1893 (No. 524 in the catalogue of that year). It has been reproduced in botanical periodicals on several occasions (e.g., 1893, *J. Bot.*, **31**, 243; 1893, *Gardener's Chronicle*, ser. 3, **13**, 746; 1933, *Rep. Bot. Soc. and E.C.*, **10**, *t.* 45, 289). Many framed copies were distributed to botanists in 1893, and one was hung as far afield as the office of our member, Mr H. N. Ridley, in Singapore. A cartoon in which the ink-stand is replaced by a bottle of hair lotion with an apt caption appeared in the *Pall Mall Budget* for May 25, 1893, and is here reproduced.

An American "appreciation" of the portrait of J. G. Baker quoted from *Meehan's Monthly* for September 1893 (1893, *J. Bot.*, **31**, 350) seems to anticipate recent research on the important influence of posture on work. It was quoted as follows:—

"He is represented with some Onoclea-like fern on the table before him, about which he is penning notes. The pleasure it gives to see for the first time the facial outlines of one so much beloved is mingled with regret that his hard labours cannot be softened by the use of a fountain pen instead of an old steel one; and instead of having himself bent down to his work till his body is at right angles with his legs, and his nose but a few inches from his wrist, some better care for his vital organs have not been provided for. It is well worth some thought and a little expense in improved furniture to add ten or fifteen years to the life of such a useful man as J. G. Baker."

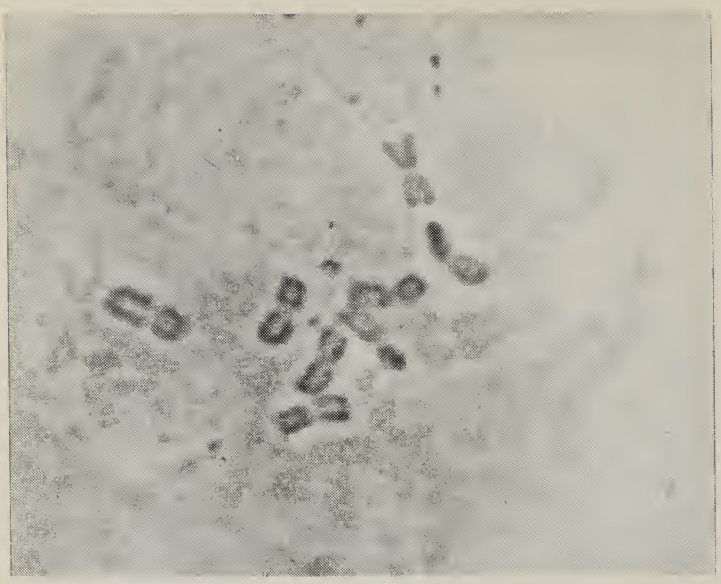
In spite of the fears of the American writer this "useful man" lived for another 27 years, and the lesson of comfort has still to be learned by many enthusiastic botanists!

An obituary notice of Edmund Baker will appear in *Watsonia*, but this seems a suitable place to recount his early connection with the affairs of our Society. His father, J. G. Baker, was President of the Thirsk Natural History Society which took over the Botanical Exchange Club section of the work of the Botanical Society of London when that body was disbanded in 1858. Managing a large general drapery and grocery business founded by his father in Market Square, Thirsk, J. G. Baker was, nevertheless, able to find time for botanical work which established him as one of the leading amateur botanists of his day. On May 9th, 1864, he met with a misfortune which changed the whole course of his future career.

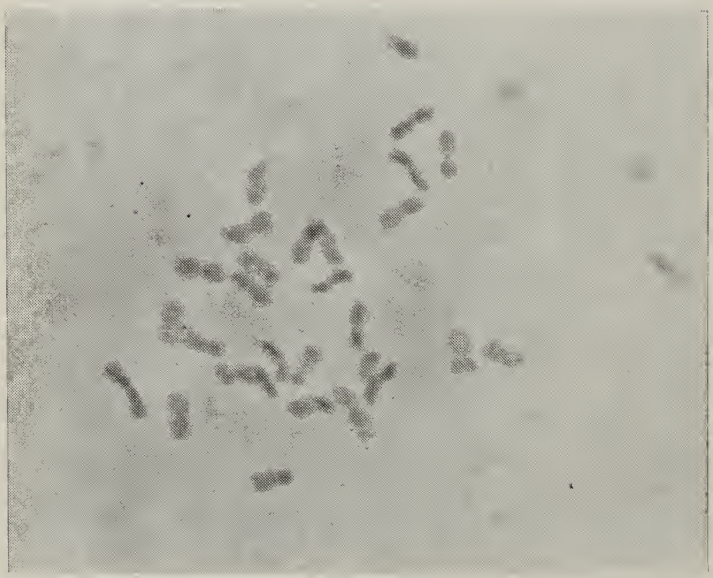
The fire which on that night destroyed J. G. Baker's house with almost all its contents—including his herbarium, botanical library and the stock of the first edition of his *Flora of North Yorkshire*—has been graphically described by T. J. Foggitt who witnessed it (1933, *Rep. Bot. Soc. and E.C.* **10**, 296-297). Edmund Baker, then exactly three months old, saved his parents' lives with his cries. It is from the will of this infant of 85 years ago that the Society has now benefited.

His father's disastrous loss had a remarkable sequel. Various circ-circumstances (which are described fully in 1921, *Proc. Roy. Soc.* B, **92**, xxv) had paved the way for a new appointment at Kew, and Dr (afterwards Sir Joseph) Hooker invited J. G. Baker to accept the post of First Assistant. He took up this appointment in January, 1866. The letter conveying the invitation, together with connected correspondence, was found amongst Edmund Baker's papers and has been presented by Mrs Trent to the Royal Botanic Gardens, where it has been filed in the Herbarium Library. Gilbert Baker retained his interest in the Botanical Exchange Club which, following his removal, became known as the London Botanical Exchange Club in 1866. He will always be remembered for his work in continuing the activities of our Society at a time when his own troubles were enough to have overcome a lesser man.

It is, therefore, appropriate that his son should have bequeathed this fine portrait to the larger organisation which has descended from the modest Club for which his father did so much. The picture will be labelled with a plaque and housed on our behalf by the Linnean Society in their rooms. Of that Society both Bakers were Fellows for many years and it is appropriate as well as generous of their Council to undertake care of the portrait.



A.



B.

Plate 1. Chromosomes of *M. scabrum* (A) and *M. effusum* (B) from root-tip preparations pre-treated with bromo-naphthalene for 3 hours, fixed in acetic alcohol and stained with Feulgen's stain. × 1800.

From the Trower Fund.

MILIUM SCABRUM Merlet

By T. G. Tutin.

(a) GENERAL.

The occurrence of *Milium scabrum* in Guernsey was first reported by C. R. P. Andrews (1900A, B) but in spite of several searches it was not refound until 1949. Andrews found the plant in April 1899 and during the period of 50 years which has elapsed before its rediscovery it has been suggested that it was never more than a casual. The following facts will, I believe, make it clear that the plant is native on the island and will also, at least in part, explain why it was not refound sooner.

Andrews stated that the locality in which he found it was on the cliffs near Petit Bot on the south coast of Guernsey and subsequently (1940) amplified this in a letter, a copy of which is in the Herbarium at Kew. In this letter it is said to have been found on a grassy patch below the path along the top, but well above the vertical part of the cliff (not at the foot of a vertical cliff as Marquand (1901) states, about half way between Jaonnet and Petit Bot. In spite of these definite statements there appears to be some doubt about the original locality, as Lousley (*in litt.*) states that Pugsley informed him that Andrews found the plant in his vasculum at the end of a day's collecting and there was some uncertainty about the exact locality.

This doubt is increased by the fact that it was rediscovered by J. E. Raven and myself on L'Ancresse Common on the north coast of Guernsey, and that in spite of repeated search we failed to find either the plant or any apparently suitable habitat for it in the neighbourhood of Petit Bot. It is likely, therefore, that search has been made during the past 50 years in a locality where the plant does not grow at all, or is at best very rare.

On the north and north-west coasts of Guernsey the plant grows abundantly, though usually in small patches, towards the western end of L'Ancresse Common, Grand Havre (N. D. Simpson *in litt.*), at Vazon Bay and, doubtless, elsewhere.

The habitat in which *Milium scabrum* grows in Guernsey is on fixed dunes in short but nearly closed turf. The following lists from two stations on L'Ancresse Common will give an idea of the common associates:—

A		B	
Ranunculus bulbosus L.	o	*Cochlearia danica* L.	la
Erophila sp.	o	*Cerastium semidecandrum* L.	r
Cochlearia danica L.	o	*Trifolium repens* L.	r
Cerastium semidecandrum L.	r	*Lotus corniculatus* L.	f
Ononis repens L.	f	*Vicia lathyroides* L.	r
Lotus hispidus Desf.	f	*Sedum acre* L.	lf
Poterium Sanguisorba L.	o	*Galium verum* L.	r
Daucus Carota L.	f	*Bellis perennis* L.	f
Galium verum L.	r	*Thymus* sp.	f
Bellis perennis L.	f	*Plantago Coronopus* L.	o
Myosotis hispida Schlecht. (*M. collina* auct.)	r	*Milium scabrum* Merl.	o
Thymus sp.	la	*Mibora minima* (L.) Desv.	r
Plantago Coronopus L.	r	*Dactylis glomerata* L.	f
Plantago lanceolata L.	f	*Festuca pratensis* Huds.	f
Euphorbia portlandica L.	r	*Festuca ovina* L.	a
Milium scabrum Merl.	f		
Mibora minima (L.) Desv.	o		
Dactylis glomerata L.	f		
Festuca ovina L.	a		
Agropyron pungens R. & S.	la		
Camptothecium lutescens B. & S.	la		

a=abundant, f=frequent, o=occasional, r=rare, l=locally.

It will be noticed that *Scilla autumnalis* L., though abundant in the neighbourhood and often occurring within a few feet of patches of *M. scabrum*, does not appear to grow actually mixed with it. All the plants of *Milium* we observed had the culms bent sharply about 2 cm. above the base so that the small culm leaves and narrow inflorescence were lying flat among the other constituents of the turf, a habit that makes the plant difficult to see and indeed less conspicuous than the considerably smaller, but erect and reddish tufts of *Mibora*. Mr N. D. Simpson, who visited the locality when the seed was ripe early in May, tells me that at that time the plant was more conspicuous, as it had bleached to a whitish colour.

The distribution of *M. scabrum* is not very clearly understood, as this species has been confused with *M. vernale* M. Bieb., a similar but larger plant with a spreading panicle. As far as can be ascertained *M. scabrum* is confined to the coasts of western Europe from the Netherlands (coast near Leiden) to Portugal, while *M. vernale* is essentially a Mediterranean species. *M. scabrum* appears to be local throughout its range and to grow in habitats similar to those it occupies in Guernsey.

In view of its very local occurrence, early flowering season and inconspicuousness it is possible that it may have been overlooked and it seems worth making a careful search for it in suitable habitats in the southern part of England.

(b) CYTOLOGY.

Milium scabrum shares with *Airopsis tenella* (Cav.) Coss. & Dur., *Periballia laevis* (Brot.) Asch. & Graebn. (Litardière, 1948) and *Holcus*

Gayanus Boiss. (Litardière, 1949) the peculiarity of having the diploid chromosome number of 8 (plate 1). The three species examined by Litardière are, like *M. scabrum*, small annuals and have a south-western (hispano-lusitanian) distribution. In other respects, however, *M. scabrum* is widely different from the other three grasses with 2n = 8, which are all members of the Tribe *Aveneae*, and shows an exceedingly close morphological agreement with *M. vernale* M. Bieb. and *M. effusum* L. *M. vernale* and *M. effusum* were examined cytologically by Avdulov (1928), who found 2n = 18 and 2n = 28 respectively. The latter number has been confirmed by A. & D. Löve (1944) and by myself (plate 1) using material from Swithland Wood, Leicestershire. It is rather curious to find three different basic chromosome numbers (4, 9 and 14) in a small genus which appears to be very homogeneous morphologically, especially when it is combined with the considerable difference in size of chromosomes that there is between *M. scabrum* and *M. effusum*. It has not so far been possible to re-examine *M. vernale* but as most of the differences between it and *M. scabrum* are matters of size it is possible that it is in fact a tetraploid with 2n = 16.

(c) SYSTEMATIC POSITION OF MILIUM.

The genus *Milium* must in spite of its diverse chromosome numbers be regarded as a " natural " genus, since there is very close agreement in all other characters between its three species. It has been variously placed in the tribes *Stipeae*, *Paniceae* and *Agrosteae* or *Agrosteae* subtribe *Milieae* (Cosson & Germain, 1845), all of which have spikelets with one floret. It resembles the *Stipeae* in the strongly indurated lemma and palea and the untoothed lodicules, but differs in the absence of awn, in having 2 lodicules instead of 3 and in the basic chromosome numbers, which in the *Stipeae* are 9, 10, 11, 12, 17 and 19, but apparently never 4 or 14. From the *Agrosteae* it differs in having untoothed lodicules and, at least from the bulk of this tribe, in having the lemma and palea strongly indurated in fruit. It resembles the *Paniceae* in the dorsally compressed spikelets and indurated lemma and palea but differs from this tribe in most other respects. It would therefore seem best to keep the small tribe *Milieae* with *Milium* as the only genus.

This tribe may be described as follows: Annual or perennial herbs. Leaves of the festucoid type but with few or no silica cells; 2-celled hairs absent. First foliage leaf of seedling narrow and erect. Ligule glabrous. Inflorescence an effuse or narrow panicle of rather few spikelets. *Spikelets* of one floret, awnless, slightly *dorsally compressed*; rhachilla disarticulating above the glumes, not or very rarely produced beyond the floret. Glumes exceeding the lemma or equalling it in length, subequal, persistent, herbaceous-membranous, 3-nerved; nerves more or less parallel, not reaching the tip of the glumes. *Lemma* rounded on the back, thick, *becoming strongly indurated in fruit*, very smooth and glossy, faintly 5-nerved; *awn absent*. *Palea strongly indurated in fruit*, 2-nerved. *Lodicules* 2, *untoothed*, acute. Stamens 3. Ovary

glabrous, without an appendage; styles free. Fruit with a linear hilum $\frac{1}{3}$-$\frac{2}{3}$ the length of the caryopsis. Starch grains compound. Chromosome large or rather small, basic numbers 4, 14, (? 9).

I should like to thank the Director of the Royal Botanic Gardens, Kew, for the loan of specimens, and Mr C. E. Hubbard for assistance with the description of the tribe *Milieae*.

ANDREWS, C. R. P., 1900A, Two grasses new to the Channel Islands, *J. Bot.*, **38**, 35-37.

——, 1900B, *Proc. Linn. Soc.*, sess. **112**, 5.

COSSON, E. ST. C., & GERMAIN DE SAINT-PIERRE, E., 1845, *Fl. Env. Paris*, 616.

MARQUAND, E. D., 1901, *Flora of Guernsey and the lesser Channel Islands*; London.

LITARDIERE, R. DE, 1948, *Comptes Rendus des séances de l'Académie des Sciences*, **227**, 1071-2.

- —, 1949, *ibid.*, **228**, 1786-7.

AVDULOV, N. P., 1928, *Dnevn. Vsesoyuzn. S'yezda Bot. Leningr.*, **1**.

LÖVE, Á. & D., 1944, Cyto-taxonomical Studies on Boreal Plants. III. Some new chromosome numbers of Scandinavian plants, *Arkiv för Botanik* **31A**, No. 12.

Plate 1. *Veronica comosa* Richt. Isotype. $\times\frac{2}{3}$ approx.

From the Trower Fund.

THE CORRECT NAME FOR VERONICA AQUATICA Bernhardi

By J. H. Burnett,
Department of Botany, Oxford University.

The section *Beccabunga* Griseb. of the genus *Veronica* Linn. includes three plants found in the British Isles, namely *V. Beccabunga* L., *V. Anagallis-aquatica* L. and *V. aquatica* Bernh. This last plant was long confused with *V. Anagallis-aquatica* and it was first described as a separate species by Bernhardi (1834). Unfortunately, S. F. Gray (1821) had already used the name *Veronica aquatica* to designate *V. anagallis-aquatica* L. Therefore, under Article 61 of the International Rules of Botanical Nomenclature (1935), *Veronica aquatica* Bernh. is an illegitimate later homonym and must be rejected It has thus become necessary to establish the correct name for this plant, although Keller (1942, 1944) has proposed that *V. aquatica* Bernh. be retained as a *nomen conservandum*.

Fernald (1939) first drew attention to this matter and advocated the use of *Veronica salina* Schur, and earlier Jávorka (1925) had in fact used this name. Fernald has also been followed by Pennell (1943) in his latest work. Mansfeld (1940) and Hylander (1945) have not accepted this name and have proposed *Veronica comosa* Richter instead.* I do not consider either of these names to be applicable and propose the adoption of Veronica catenata Pennell (1921).

Possible synonyms may be found in Römpp's and Schlenker's monographs (Römpp, 1928; Schlenker, 1936); in historical sequence these are:—

1791	*Veronica tenerrima* Schmidt
1792	*Veronica acutifolia* Gilibert
1830-1832	*Veronica indica* Roxburgh ex A. Dietrich
1866	*Veronica salina* Schur
1885	*Veronica comosa* Richter
1921	*Veronica catenata* Pennell
1935	*Veronica connata* Rafinesque sensu Pennell

Schmidt's original sheet of *V. tenerrima* is in the Vienna herbarium and Schuster, commenting on it, says:

"Auf der originale Tikette bermerkt Schmidt: 'An varietas sit Anagallidis, adhunc dubito, donec cultura decidat.' Da sie Schmidt (1793) in seiner Flora Boëmica als Art aufnahm, scheint sie sich samenbeständig gehalten zu haben. Wegen der ganzrandigen teilweise kurz gestielter unterem Blätter hielt sie Beck vermütlich für eine Form von beccabunga, aber alle Merkmale, namentlich die vierkantige Stengel, sprechen für aquatica." (Schuster, 1906.)

"On the original label Schmidt remarks, 'An varietas sit Anagallidis, adhunc dubito, donec cultura decidat.' As Schmidt took up the

*Fernald (1950, *Gray's Manual of Botany*, ed. 8, 1284) has, while this paper was in the press, also adopted this name, but without explanation.

species in his *Flora Boëmica* (1793) it seems to have bred true for him. Beck believed it to be most likely a form of *beccabunga* because of the entire, sometimes shortly-petioled, lower leaves, but all the characters, especially the four-angled stem, suggest *aquatica*."

As Schuster remarks, the four-angled stem militates against *V. Beccabunga*, but there is general agreement (Britton, 1928; Schlenker, 1935/6, 1936; Glück, 1936) that the leaves, even the primary leaves and those of depauperate forms, of *V. aquatica* are never petiolate. It seems probable, therefore, that Schmidt's plant is referable to that form usually known to British botanists as *V. Anagallis-aquatica* L. var. *montioides* Boiss. (Hiern, 1898), and indeed Schlenker so determined Schmidt's original specimens. Therefore, although I have not actually seen the original sheet, the circumstantial evidence is so strong that *Veronica tenerrima* Schmidt may safely be rejected from the synonymy of *V. aquatica* Bernh.

There appears to be no specimen extant of Gilbert's *Veronica acutifolia* but it is clear from his description that he is merely re-describing a form of *Veronica Anagallis-aquatica*. This name may therefore be rejected outright for *V. aquatica* Bernh. as was done by Römpp and Schlenker.

Römpp cites *V. indica* Roxb. in the synonymy of *V. aquatica*, but this is an error. Roxburgh used this name " in litt." for *V. undulata* Wallich, a form closely allied to *V. Anagallis-aquatica* L., and it was published by A. Dietrich in his (6th) edition of the *Species Plantarum*. It is clearly irrevelant to the present issue.

Fernald (1939) has adopted Schur's name *Veronica salina* and supports his view by quoting extensively from the original description. Nevertheless, he omits the description of the capsule, namely " capsula *elliptica*, obtusa calycem superante " (italics mine). Surely this phrase, coupled with " floribus minimis numerosissimis " and " rachi pedunculis calycibusque parce glanduloso-pilosis," indicates that Schur was, in fact, re-describing *Veronica anagalloides* Guss., despite his statement that the plant had a reddish corolla. Pennell (1921) has remarked, " *V. salina* Schur Enum. Pl. Transsilv., 492, 1866, very similar to *V. anagalloides*," and, although he has since adopted Fernald's usage, it seems likely that Schur considered this to be the true affinity of his plant, since his description, No. 2649, follows, and is separated from that of *V. Anagallis-aquatica* by, that of *V. anagalloides*.

As the type sheet was destroyed during the war at Lwow, it is only possible to decide on the merits of this name from the description. I consider that the description is ambiguous and, in certain important particulars, e.g., the capsule-shape, incorrect for *V. aquatica* Bernh., and I therefore propose that *Veronica salina* Schur be rejected as a *nomen dubium*.*

*Since this paper went to press I have received a sheet of *Veronica salina* from the Vienna Herbarium, named by Schur himself. It is without doubt *Veronica anagalloides* Guss. so completely disposing of Fernald's claim.

Plate 2a. *V. comosa* Richt., single flower. ×5.

Plate 2b. *V. catenata* Pennell, capsule. ×5.

From the Trower Fund.

In 1940, Mansfeld drew attention to the fact that Bornmüller (1907) had referred *Veronica comosa* Richter to *V. Anagallis* L. var. *aquatica* (Bernh.) f. *bracteosa* Bornm. (=*V. anagalloides* Guss. var. *bracteosa* Hausskn. et Bornm.). Accordingly he suggested that *V. comosa* Richt. should be taken up for *V. aquatica* Bernh., and he is followed in this by Hylander (1945). Schlenker, under the heading " Doubtful forms," wrote:

" f. *bracteosa* Bornm. in Bull. l'Herb. Boiss., Sér. II, T, VII, 1907, 970. Synonym: ?*V. comosa* Richt. ex Stapf in Denkschr. k. Akad. Wiss., **50**, II, 1885, 24? . . . Die originale der *V. comosa*: Persia borealis, ad Rescht, 23.April 1882 Herb. Wien sind sehr junge Pflanzen vom Habitus der *V. aquatica* Bernh. Die (unreifen) Kapseln sind sehr klein und ziemlich schmal, die Fruchtstiele bis über 7 mm. lang. Das von Bornmüller gesammelte Exemplar dieser Form: Mesopotamia Austr. ad Basra (exs. No. 547) im Herb. Berlin besitzt ebenfalls kleine, jedoch breitere Kapseln und kürzere Fruchtstiele und kann mit grösserer Sicherheit zu *V. aquatica* subsp. *laticarpa* gerechnet werden. Die Vergrösserung der Deckblätter ist wohl bei beiden Examplaren durch äussere Einflüsse bedingt." (Schlenker 1936, p. 18.)

" The originals of *V. comosa*: Persia borealis, ad Rescht, 23 April 1882, in Herb. Vienna are very young plants with the habit of *V. aquatica* Bernh. The (unripe) capsules are very small and rather narrow, the peduncles up to over 7 mm. long. The example of this form collected by Bornmüller: Mesopotamia Austr. ad Basra (exs. No. 547) in Herb. Berlin also possesses small yet broader capsules and shorter peduncles and can be referred to *V. aquatica* subsp. *laticarpa* with greater certainty. The enlargement of the bracts is probably caused, in both specimens, by external influences."

It is evident, therefore, that Schlenker was not entirely satisfied with the identity of *V. comosa* Richt., and, indeed, the absence of mature capsules or of indication of the flower-colour (which is not given in Richter's original diagnosis) causes a precise determination to be difficult. I have not seen the original sheet, but, through the courtesy of the Director, Royal Botanic Gardens, Kew, I have been able to study an isotype. This sheet is illustrated in Plates 1 and 2a. One is immediately struck by the characteristic appearance of the plant, which is largely determined by its habit and the form of the bracts and the flowers. The habit is unusual in that the internodes are very short in relation to the length of the leaves. I have never seen such a combination in normal or depauperate herbarium material of *V. aquatica* or even in the developmental phases of living plants. The leaves themselves are remarkable for their coarse and close serration, which is quite unlike anything I have seen in *V. aquatica*, although this condition is approached in some specimens of *V. Anagallis-aquatica*. Finally, there are the relatively slender pedicels arising at acute angles from the rhachis, subtended by long elliptical bracts (up to 1.2 cm.) with acute to acuminate tips, and the lanceolate sepals; these are quite unlike

such structures in *V. aquatica* Bernh., which has relatively robust pedicels subtended by oblong-obtuse bracts and narrowly ovate, obtuse sepals. These dissimilarities and the absence of mature capsules make the identification of *V. comosa* Richt. with *V. aquatica* Bernh. very uncertain, and indeed, in my opinion, the former plant more closely resembles *V. Anagallis-aquatica* L. (Richter himself remarked, " Vorliegende Pflanzen steht der *V. anagallis* L. ziemlich nahe, und dürfte sich vielleicht einst als Varietät derselben herausstellen "—" The plant under consideration is rather near *V. anagallis* L. and may possibly in the future turn out to be a variety of this plant.") *Veronica comosa* Richt. should therefore be rejected as a synonym of *V. aquatica* Bernh.

In 1921 F. W. Pennell described under the name *V. catenata* a Water Speedwell which he believed to be indigenous to North America. The type plant, *P. A. Rydberg*, No. 926, is illustrated in Plates 2b and 3. Through the courtesy of the Director, New York Botanic Garden, I have been able to examine the holotype, and I find it quite impossible to distinguish it from European material of *Veronica aquatica* Bernh. This view has also been expressed by Römpp, by Schlenker and by Fernald, the last two having also seen the holotype. *V. catenata* possesses linear-lanceolate, sessile leaves; fewer-flowered racemes with robust divergent pedicels (becoming horizontally spreading in fruit). each subtended by an oblong-obtuse bract; and obcordate, deeply-notched capsules usually longer than the narrowly lanceolate-ovate, obtuse sepals. All these features are characteristic of *V. aquatica* Bernh.

It will be noticed, however, that the sheet is also annotated " *V. connata glaberrima* Pennell F.W.P. 1934." In this year Pennell adopted Rafinesque's poorly-characterised *V. connata* (Rafinesque, 1830) of which no type material is known, claiming it to be conspecific with his *V. catenata*. Pennell (1935) describes this plant as having " leaves lanceolate and acute, connate and entire, racemes divaricate and very long, pedicels twice as long as bracts, capsule bi-lobed and compressed." This is clearly a description of *V. scutellata* L., and indeed in 1921 Pennell had referred *V. connata* Raf. correctly to this species, suggesting that it was merely a long-leaved variant. Both Römpp and Schlenker refer *V. connata* Raf. unequivocally to the synonymy of *V. scutellata* L., and with this view I concur. Therefore *V. connata* Raf. may be eliminated from the synonymy of *V. catenata* Pennell.

It may be concluded with some degree of certainty, therefore, that the correct citation of the plant hitherto known as *Veronica aquatica* Bernhardi is in fact VERONICA CATENATA F. W. Pennell, 1921, *Rhodora*, **23**, 37.

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Plate 3. *Veronica catenata* Pennell. Type. ×⅓ approx.

From the Trower Fund.

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THE ROOT PARASITISM OF EUPHRASIA SALISBURGENSIS Funck.

By A. J. Crosby-Browne.

It is usually held that the genus Euphrasia is a root parasite upon various grasses and *Carices* (Koch. 1891; Wettstein, 1896; Townsend, 1897). Although there have been occasional reports of Euphrasias growing without the aid of root parasitism, it is generally stressed that such plants were depauperate, failed to flower, or died quickly. Heinricher 1898A, 1898B, 1901), however, working in Germany, listed as hosts species of the following genera:—*Poa*, *Avena*. *Festuca*, *Carex*, *Luzula*, *Senecio*, *Trifolium*, *Capsella* and *Epilobium*, but this work appears to have been almost completely ignored (Boeshore, 1920).

In August 1949 the root systems of *E. salisburgensis* were investigated on the Altiplano of Monte Majella in the mountains of the Abruzzi, Italy. Individual plants averaged 3 cms. in height, their root systems often growing down more than 10 cms. All were flowering and colour variations occurred. The data presented below indicate that plants of this species, at least, have an even wider range of hosts than has been reported previously and from an equally wide range of families.

Name of Plant.	No. of cases of parasitism observed microscopically.	No. of cases of probable parasitism observed in the field (hand lens).
**Dryas octopetala* L.	4	6
Helianthemum grandiflorum DC.	3	2
Saxifraga Aizoon L.	1	
**Draba aizoides* L.	1	
Salix retusa L.		3
**Silene acaulis* (L.) Jacq.		2 + †
**Trinia glauca* (L.) Dum.		1 + †
Thymus subcitratus Schreb.		1

* = British Species. † = Host dead.

Typical plants were also found growing at points up to 30 cms. removed from any evident plant material either living or dead, on or below the soil surface, but this point requires further investigation.

It is hoped to continue this work, both in this country and abroad, with special reference to the various species of *Euphrasia*, in order to see if any vary in their range of hosts. In view of the number of families of flowering plants involved it would be interesting to see if any differences are detectable between individuals of a species growing unaided, and those upon hosts of different families. Similar problems are raised by other root parasites such as *Melampyrum*, *Bartsia*, *Pedicularis*, *Rhinanthus* and the *Orobanchaceae*.

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NOTES ON THE FLORA OF THE SCILLY ISLES AND THE LIZARD HEAD

By J. E. Raven.

The Isles of Scilly and the Lizard Head are still little known to botanists in the early spring. In the course of a stay of ten days (from March 27th to April 6th, 1950) in the Scilly Isles, followed by five days at the Lizard, my father, Dr R. C. L. Burges and I made a number of discoveries that seem to call for a brief note.

The first plant of interest is *Poa infirma* H.B.K., the ally of *Poa annua* L. known to British botanists from the Channel Isles under the names —among others—of *Poa annua* var. *remotiflora* (Murb.) and *P. exilis* (Freyn) Murb. This grass is in perfect condition in early April and may well disappear comparatively early in the season. On the islands of St Mary's, Tresco and St Martin's, we found it to be widely distributed and often abundant on waste places, roadsides, tracks and cliff-paths. We did not visit Bryher or any of the uninhabited islands. On St Agnes we failed to observe it, but there is every reason to suppose that it will be found there also. It frequently grows in the company of *Poa annua*, from which it can usually be distinguished, even at a distance, by its yellow-green colour.

For *Viola nana* (DC.) Corbière there are apparently two old localities: first, sandhills near New Grimsby, Tresco, where it was said to have been exterminated by the building of the sea-plane base in the 1914-18 war; and second, sandy fields below the school on St Martin's. In this latter station, early in June 1948, I did eventually find, in fields that had recently been dug, a very small number of unusually robust plants. Professor T. G. Tutin, however, had told us that in 1936 he had seen the plant on Tresco, and we therefore made a careful search of suitable ground. We succeeded in finding two quite distinct colonies, each restricted to a very small area of sandy, closed, rabbit-grazed turf. In the first of these areas the plant was exceedingly abundant, in the second relatively scarce. It was always very small, about an inch in height, but was already on March 29th flowering freely.

The main objective of our visit to the Scilly Isles was, however, to try to determine the identity of the species of *Ophioglossum* on the islands. On previous visits we had formed the opinion that both *O. vulgatum* L. var. *polyphyllum* Braun and *O. lusitanicum* L. were present; and on this occasion we were able fully to corroborate that belief. Indeed *O. vulgatum* var. *polyphyllum* was found in a large number of localities, chiefly on Tresco and St Martin's, but also in one spot, of which we had been told by Mr J. E. Lousley, at the northern end of St Mary's. The type of habitat was always much the same, gentle slopes of closed turf on a sandy subsoil. On Tresco the plant seems

almost always to be accompanied by *Scilla non-scripta*. In most localities there were already many fronds above ground, a large proportion of which bore fertile spikes in an early stage of development. The roots of this plant are long and fibrous, and the small rhizome bears either one or two fronds, both of which are sometimes fertile. The fronds are narrowly ovate, quite thin in texture and of a uniformly bright dark green with a curiously metallic gloss.

On St Agnes, where we failed to detect *O. vulgatum* var. *polyphyllum*, my father and I had previously found a single small colony of a strikingly distinct plant. On this occasion we twice revisited this same colony, but, despite a careful search of the rest of the island, did not succeed in finding any others. The habitat lies on the rough heath in the southern half of the island. It is a flat area, of little more than a square yard, at the foot of a large boulder. It bears such species as *Armeria maritima* and *Plantago Coronopus* and is surrounded by stunted *Calluna* and *Ulex*. In this small area there were at least a hundred specimens of *Ophioglossum lusitanicum*, a plant of barely half the size of *O. vulgatum* var. *polyphyllum*—often indeed much smaller —the frond of which is narrower, of a leathery texture and with almost parallel sides. By the beginning of April the fertile spikes had all fallen, except for a single one that was dried and bent, and the fronds, which lie flat upon the ground, were beginning to turn yellow. The stock consists of a larger rhizome than that of *O. vulgatum* var. *polyphyllum*, bearing a few shorter fibres. In this case too some rhizomes bear two fronds, but this species evidently fruits, here at least, much less freely than its ally. Both in the nature of its habitat and in its appearance and time of fruiting, the plant on St Agnes seemed to us to be unquestionably conspecific with that which we had seen, on about the same date in 1949, on the cliffs of Petit Bot in Guernsey. And this impression, based primarily upon the field characters, was confirmed by Mr A. H. G. Alston, whose comment on the fresh specimens sent to him from St Agnes was as follows: "I think that it is *O. lusitanicum* because of the narrow fleshy leaves without small secondary veins and the straight-sided epidermal cells."

None of the species here reported from the Scilly Isles had yet been found upon the Lizard Head. We ourselves searched many areas that appeared to be superficially suitable for each, but were successful in finding only *Poa infirma*. It, at least, seems to be not uncommon; though there is only a little of it in the Caerthilian valley and on the Lizard Town green, it proved to be plentiful and widely distributed on a stretch of cliff between Kennack Sands and Black Head. Here it sometimes attains unusual dimensions; Professor Tutin, who kindly confirmed our determination of the grass both here and on the Scilly Isles, commented on one exceptionally coarse and broad-leaved specimen from near Kennack that "the large plant is also *Poa infirma*, looking much more like it does in the Mediterranean than anything else I have seen here." In this station, too, it was occasionally accompanied by dense tufts of *Juncus capitatus* Weig., much of it already in full flower, on

these sheltered sunny slopes, as early in the season as April 9th. But apart from *Poa infirma*, all the other species found on the Scilly Isles were, on the mainland, conspicuous by their absence.

On the other hand, a number of plants characteristic of the Lizard Head have yet to be found in the Scilly Isles. *Isoetes Hystrix* Durieu, for instance, the range of which on the mainland is considerably greater than has yet been reported—we saw it in abundance not only in the Caerthilian and Kynance valleys but also in Gew-graze and near Mullion Cove—would appear to be absent from Scilly: long and careful search of many likely areas proved invariably fruitless. And the same can be said, though with less confidence so early in the season, of *Juncus capitatus*. Again, while *Artrolobium pinnatum* (Mill.) Britten & Rendle, so common in the Scilly Isles, is unknown on the mainland, the three characteristic clovers of the Lizard—one at least of which, *T. strictum* L., was evidently going to be unusually abundant and fine this year—remain as yet undiscovered in the Scilly Isles. It would appear, therefore, if only the rarest species are taken into account, that the differences between the floras of the two districts greatly outweigh the similarities.

The differences between the floras of mainland Cornwall as a whole and the Scilly Isles are indeed much greater than this. Further investigation of this fact, due presumably to a combination of edaphic and climatic factors, might well yield illuminating results. In any case, a week of the spring spent in either area can hardly fail to be of the utmost interest to the field-botanist.

NOTES AND ADDITIONS TO THE FLORA OF THE ISLANDS OF S.W. CORK

By O. Polunin.

In August 1947 and 1948 I spent two periods of one month holidaying and botanising among the islands of S.W. Cork. I visited all the islands of any size, including Sherkin, Clear, Horse, Hare, Calf, etc., for a short period, and made lists of flowering plants as a preliminary to a survey of the island plant communities.

A total of 415* species of flowering plants and ferns was recorded for the islands compared with a total of 768 recorded for the whole of v.-c. H3, W. Cork, in the Census list of Praeger (1934, *The Botanist in Ireland*). The total for Sherkin Island was 388 and as by far the greater part of the time was spent on this island it may be considered to be fairly complete.

South West Cork as a whole, with the exception of the favoured district round Glengarriff and Bantry Bay, where some of the rarer Irish plants are to be found, has attracted few botanists in recent years. Nearly all records date from T. Allin (1883, *Flowering Plants and Ferns of the County Cork*) and from R. A. Phillips, who botanised in this area between 1891-1902.

A gap of 45 years in the records of the flora may be expected to reveal some interesting changes among the plants of the islands During this time the human population has decreased steadily and some islands, viz., Castle and the Calf Islands, are no longer inhabited. Also changes in tillage, and the use of grass and cereal seed from further afield may have had a considerable effect on the weeds of cultivation.

There are, unfortunately, no earlier complete lists of plants from any of the islands and the records that exist are scanty. The following plants recorded by Allin, Phillips† and others for the islands were also found by me:—

Ranunculus Baudotii Godr.
Glaucium flavum Crantz.
Cochlearia groenlandica L.
Raphanus maritimus Sm.
Melandrium dioicum (L.) Coss & Germ.
Althaea officinalis L.
Lavatera arborea L.
Erodium moschatum (L.) Ait.
Erodium maritimum (L.) Ait.
Trifolium arvense L.
Rubia peregrinum L.
Artemisia Absinthium L.
Centunculus minimus L.
Linaria Elatine (L.) Mill.
Scutellaria minor Huds.

*Further visits to the islands in 1949 and 1950 have increased this number to 441 and the total for Sherkin Island to 413. *Torilis nodosa*, *Salix fragilis* and *Carex muricata* have now been found.

†Mr R. D. Meikle possesses Phillips' own copy of Allin's Flora, which I was able to see. There are a number of records in his own handwriting of island localities (mostly unpublished) which I have included in the lists below.

Lamium hybridum Vill.
Littorella uniflora (L.) Aschers.
Rumex pulcher L.
Euphorbia hyberna L.
Humulus Lupulus L.
Spiranthes spiralis (L.) Chevall.
Sparganium minimum (Hartm.) Fr.
Desmazeria marina (L.) Druce.
Agropyron junceum (L.) Beauv.

I failed to find the following plants which had previously been recorded for these islands:—

Fumaria parviflora Lam.
Helianthemum guttatum (L.) Mill.
Helianthemum nummularium (L.) Mill.
Eryngium campestre L.
Torilis nodosa (L.) Gaertn.
Antennaria margaritacea (L.) Gaertn.
Cichorium Intybus L.
Centaurium pulchellum (Sw.) E. H. L. Krause.
Echium vulgare L.
Mentha Pulegium L.
Lamium amplexicaule L.
Salix fragilis L.
Carex muricata L.
Asplenium obovatum Viv.

The list of plants that follows is designed primarily to bring Praeger's Census list (1934, *The Botanist in Ireland*) up to date as regards part of v.-c. H3. A few of the rarer and more interesting plants have been added with notes of their occurrence in Kerry, for comparison.

I should like to thank Messrs R. D. Meikle, N. Y. Sandwith and A. J. Wilmott for their help in naming the majority of plants; also Messrs R. A. Graham, C. E. Hubbard, J. E. Lousley, E. Nelmes and S. M. Walters for naming critical species in this list.

* indicates a new vice-county record.

§ indicates an addition or correction to an annotated copy of the *Comital Flora*, as amended by Praeger's (1934) list [i.e., Praeger's list is used as a basis for all species included in it, *C.F.* for other (mostly alien) species].

† indicates a species introduced in the Islands.

If a plant does not occur in Praeger's list, this is stated.

§*†21/3. Papaver dubium L. (*sensu stricto*); sparingly, cornfield weed, Sherkin Island. In Kerry this species is more widespread than *P. Lecoqii* Lamotte. The latter was not collected in the islands. Det. R.D.M. and N.Y.S.

§*†32/5. Fumaria Boraei Jord.; ? rare, weed of cultivated ground, Sherkin Island. Has no doubt been overlooked in the past. Det. A.J.W.

§*†45/1. Cochlearia Armoracia L.; one plant in vicinity of old ruined castle; no longer cultivated in the islands. Not listed in Praeger (1934).

103/2. Sagina subulata (Sw.) Presl; rare, Sherkin Island. Det. A.J.W.

§*†127/7. GERANIUM PYRENAICUM Burm. f.; rare, West Calf Island. This island has not been inhabited for about 40 years, but cattle from the mainland are regularly grazed on it. It occurs in E. Cork, but not in Kerry. Det. N.Y.S.

128/1. ERODIUM MARITIMUM (L.) Ait.; Clare Island, occasional; absent in Kerry. Det. N.Y.S.

128/2. ERODIUM MOSCHATUM (L.) Ait.; rare, Sherkin, Clear and Hare Islands. Det. R.D.M. and N.Y.S.

§*155/22. TRIFOLIUM FILIFORME L.; rare, growing in close turf near sea with *T. dubium* Sibth., Tragminetu Bay, Sherkin Island. Very rare in Kerry. Det. R.D.M. and N.Y.S.

†176/12. VICIA SATIVA L.; frequent, growing in corn and potato fields but also well established along grass verges, lanes and waste places. On all inhabited islands. Not listed in Praeger (1934). Det. R.D.M. and N.Y.S.

189/9. POTENTILLA ERECTA L. × PROCUMBENS Sibth.; one plant, laneside in close proximity to parents, Sherkin Island. Occasional in Kerry. This hybrid not before recorded for v.-c. H3. Det. N.Y.S.

§†239/1. ⟨ERYNGIUM CAMPESTRE L.; careful search revealed no trace of this plant on Sherkin Island in 1947-1948. (See 1901, *Irish Nat.*, **10**, 172.) Therefore presumably extinct in its only Irish station.⟩

295/1. RUBIA PEREGRINA L.; rare, Sherkin and Clear Island.

§*†370/13. CHRYSANTHEMUM PARTHENIUM (L.) Bern.; laneside, Sherkin Island. As in Kerry most certainly an escape from gardens. Not listed in Praeger (1934).

§*†371/2. MATRICARIA CHAMOMILLA L.; rare, arable week, Clear Island. Not listed in Praeger (1934). Det. A.J.W.

476/1. CICENDIA FILIFORMIS (L.) Delarb.; locally abundant in damp and boggy ground on Sherkin and Hare Islands. Occurs only in West Cork and Kerry. Det. R.D.M. and N.Y.S.

480/9. GENTIANA CAMPESTRIS L.; rare, Horse Island. Some specimens are annuals with cotyledons present. Det. N.Y.S.

545/3. EUPHRASIA BREVIPILA Burnat & Gremli; locally abundant, all islands; addition to Praeger (1934), but see Pugsley (1940, *J. Bot.*, **7**, 13) for earlier record. Det. A.J.W.

§*545/10. EUPHRASIA OCCIDENTALIS Wettst.; ? rare, Sherkin, West Calf Islands. Det. A.J.W.

546/4. BARTSIA VISCOSA L.; frequent to locally abundant in poor pastures on all islands.

§*552/2. UTRICULARIA NEGLECTA Lehm.; often abundant in small pools and tarns, Sherkin and Clear Islands. Recorded for neighbouring v.-c.'s. Identification from flowering state. Det. R.D.M. and N.Y.S.

§*†558/4. MENTHA VIRIDIS L.; rare, grassy field, Sherkin Island. Det. R.A.G.

558/9b. ×MENTHA VERTICILLATA L. var. PALUDOSA (Sole) Druce; grassy field, Sherkin Island. Det. R.A.G.

588/5i. PLANTAGO MARITIMA L. var. BRACTEATA Blytt; one large plant of this striking form on rocky bank at edge of small salty pool at cliff-edge, Sherkin Point, Sherkin Island. See Druce (1918, *B.E.C. 1917 Rep.*, 49), Pilger (1937, Engler, *Pflanzenreich*, **IV, 269,** 175) treats it as "monstr." *bracteata* (Blytt) Pilger of var. *communis* Williams f. *dentata* (Roth) Pers. ex Williams. Det. N.Y.S.

§*600/1. CHENOPODIUM RUBRUM L.; rare, Sherkin and West Calf Islands. Growing on dried-up boggy pools near sea. Very rare and uncertain in Kerry, and absent in East Cork. Det. A.J.W.

§*606/8. ATRIPLEX LACINIATA L.; one station on sandy shore, Trabawn Bay, Sherkin Island; previously only recorded on the East Coast of Ireland. Det. R.D.M. and N.Y.S.

606/7×5. ATRIPLEX GLABRIUSCULA Edmondst. × HASTATA L.

606/7×3. ATRIPLEX GLABRIUSCULA Edmondst. × PATULA L.

Both on gravelly shores, Sherkin Island. Det. A.J.W.

618/3×6. RUMEX CRISPUS L. × OBTUSIFOLIUS L.; on exposed rocky coast; "lowest plant on spray-covered rock"; Horse Island. Recorded once for Kerry. Not previously recorded for v.-c. H.3. Det. J.E.L.

628/1. EUPHORBIA HYBERNA L.; common along sheltered lanes and walls; probably on all islands.

†650/3×2. SALIX ALBA L. × FRAGILIS L. (SALIX RUSSELLIANA Sm.); Hare Island. There is an old record from Carrigaline in Power (1845, *The Botanist's Guide for the County of Cork*), but it is not included in Praeger's Census List. Det. R.D.M.

†650/6(2). ×SALIX DASYCLADOS Wimm. (S. ACUMINATA Sm.); Hare Island, *P. J. Newbold*. Recorded as common near Cork (as *S. acuminata*) in Power (1845, *l.c.*) but regarded as a doubtful Irish plant by Colgan and Scully (1898, *Cybele Hibernica*, ed. 2, 509) and not mentioned by Praeger (1934). Det. R.D.M. (as *S. calodendron* Wimm.).

§*722/1. SPARGANIUM NEGLECTUM Beeby; ? frequent on Sherkin Island. Det. A.J.W. and N.Y.S.

722/5. Sparganium minimum Fries; rare, marsh west of Clear Island; rather rare in Kerry. Det. A.J.W.

§*745/2. Heleocharis uniglumis (Link) Schult.; ? rare, muddy pool, Sherkin Point, Sherkin Island. Recorded in Kerry but not E. Cork Det. S.M.W. (as ? Western type).

§*753/1. Carex pseudo-cyperus L.; two localities, swampy ground on edge of tarn, Sherkin Island. Does not occur in Kerry. Det. E.N.

753/18. Carex punctata Gaud.; sparingly, heathy country, Horse Island. Det. E.N.

§*†780/3(2). Agrostis gigantea Roth; Horse Island. Not listed in Praeger (1934). Det. C.E.H.

§*809/1. Koeleria gracilis Pers.; frequent, close turf by the sea, Sherkin, Clear, Horse and Hare Islands. Rather common and locally abundant by the sea in Kerry. Det. C.E.H.

814/1b. Catabrosa aquatica L. var. littoralis Parn.; one locality on fine but firm sand, Trabawn Bay, Sherkin Island. The first coloniser of sandy strand. No specimens of the typical species were collected on the islands: it is rather rare in Kerry. Det. C.E.H.

§*824/4. Poa irrigata Lindm.; Sherkin Island. Not listed in Praeger (1934). Det. C.E.H.

824/14d. Poa annua L. var. reptans Hausskn.; occasional, sandy and shingle shores, Sherkin Island. Det. C.E.H.

§*825/3. Glyceria declinata Bréb.; marsh, Sherkin Island; the marsh is separated from the sea by a sand-bar. Long Island. Not listed in Praeger (1934). Det. C.E.H.

826/7c. Festuca rubra L. var. barbata (Schrank) Richt.; exposed cliffs, Hare Island. Recorded for Kerry. Det. C.E.H.

§*†827/17. Bromus commutatus Schrad.; rare, cornfield, Sherkin Island. It occurs in Kerry and East Cork. Det. C.E.H.

†829/4. Lolium multiflorum Lam.; occasional, cultivated ground, Sherkin and Hare Island. Not given in Praeger (1934) nor in *Comital Flora*. Det. C.E.H.

830/1×4. Agropyron junceum (L.) Beauv. × repens (L.) Beauv.; Hare Island. Det. C.E.H.

NITELLA MUCRONATA Miq. VAR. GRACILLIMA Gr. & B.-W. IN WARWICKSHIRE

By G. O. Allen.

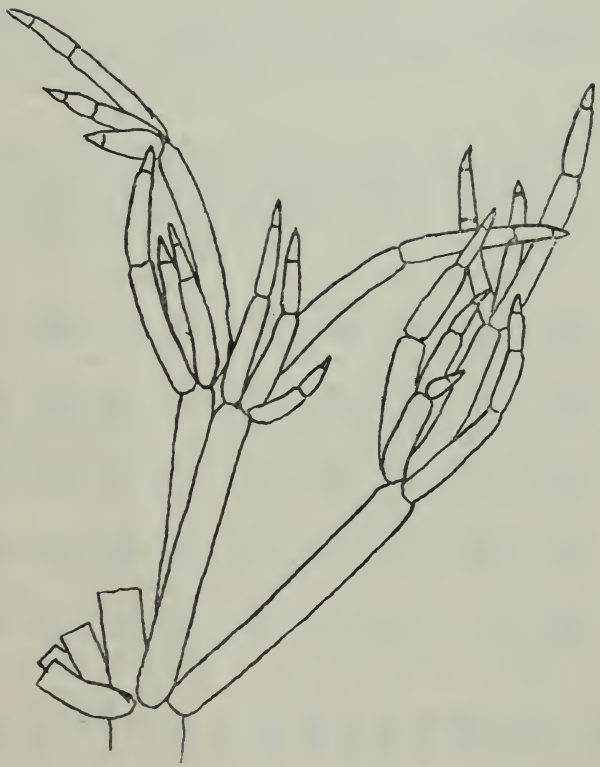
N. mucronata, a rare British species, is distinguishable mainly by the twice-forked branchlet, two-celled dactyl* and the reticulate decoration of the oöspore membrane. Its name is derived from the apex of the lower cell of the dactyl being rounded and the end-cell being small and narrow, so that a conspicuous mucro is formed. Rarely the dactyl is three-celled, but Groves was inclined to attribute this to suppressed forking.

N. mucronata var. *gracillima* Gr. & B.-W. (1917, *J. Bot.*, **55**, 324) was described from a plant found by Miss Roper in 1917 near Wickwar, W. Glos., in which the dactyls were often three-celled and the penultimate cell tapered gradually to the apex so as to be little broader than the base of the apical cell. I understand that it has not been found there since then and it has not been recorded elsewhere.

In April 1949, Mr J. L. Lyon found a plant in an old arm of the Oxford Canal, Newbold-on-Avon, near Rugby, which from the frequency of the three-celled dactyls and the tapering of the penultimate cell appears to me referable to this variety, though it tends to be somewhat stouter. It was gathered on several occasions and by August bore ripe oöspores. A few instances of four-celled dactyls were found, and I noticed one in the material from Wickwar.

The branchlets are extremely variable. Three-celled dactyls occur most frequently on sterile branchlets where there is often only one fork, which lends support to Groves's suggestion about suppressed forking. I found this to be the case also with Wickwar specimens.

*Dactyls are the rays at the final fork of the branchlet in *Nitella*. These rays are two or more in number and when there are several they somewhat resemble fingers. The term dactyl is only applicable to *Nitella*, the branchlets of which are always once or more forked, whereas in *Tolypella* and the *Chareae* the growth of the branchlets is constantly monopodial.



Nitella mucronata var. *gracillima* (×c. 20). From a specimen collected by J. L. Lyon, 30th April 1949.

ORCHIS CRUENTA Müll. IN THE BRITISH ISLANDS

By J. Heslop Harrison.

A short note on the finding of *Orchis cruenta* O. F. Müller in the counties of Galway and Mayo has already been published (Harrison, 1949). The present paper serves to expand the description of this interesting boreal species, and provides additional distributional and cytological data.

Orchis cruenta was described by Müller in Oeder's *Flora Danica* in 1782 from Röros in central Norway. Synonyms, icones and exsiccata are cited by Pugsley (1935) and by Vermeulen (1947). By the latter author the species is renamed *Dactylorchis cruenta* (Müll.) Vermeulen, following his elevation of Klinge's subgenus *Dactylorchis* to the rank of genus. Vermeulen states that he has been unable to locate the type-specimen of Müller, and the description given in his paper of 1947 is based upon a plant from Frösön, Jämtland, Sweden, 170 miles E.N.E. of Röros, which he names as the lectotype, in Herb. L. M. Neuman, Lund, and is augmented from comparison with Swiss, Russian and other Scandinavian material. It is couched in general terms, and may thus be said to refer to a population rather than to an individual. Other descriptions of *O. cruenta* which may be said to define populations in that some attempt is made to indicate the ranges of variation of taxonomic characters are those of Klinge (1898), Ascherson and Graebner (1907, where the plant is named *O. incarnatus* subsp. *cruentus*) and E. and A. Camus (1928). The latter accounts seem largely to be based upon Klinge's original work.

The earlier treatment of *O. cruenta* by the two Reichenbachs (H. G. L. Reichenbach, 1832; H. G. Reichenbach, 1851) is marred by numerous inconsistencies. The " *Orchis cruenta* Roch." of the former should, according to Ascherson and Graebner (1907) and Vermeulen (1947), fall under *O. cordigera* Fries. *O. cruenta* Müll. is represented by the elder Reichenbach's " *Orchis haematodes*," although the diagnosis of this plant is by no means identical with that of the original. The younger Reichenbach provides a plate (t. 43, I) purporting to depict *O. cruenta* Müll. The species is, however, treated in the text in his complex system of subgrouping under *Orchis incarnata* as 2. *Sublatifoliae*, a. *brevicalcaratae* bb. *rhombeilabia cruenta*. The " *O. haematodes* " of his father is relegated to 1. *Incarnatae verae*, where it features as a synonym of a. *lanceata*. Again the caption appended to the plate of this plant shows little agreement with the text, since the plant is there entitled " *O. matodes Rchb.*" (*sic*) under the general heading " *Orchis incarnata* L." Neither the figure of *O. cruenta* Müll. (t. 43, I) nor that of *O. matodes* Rchb. (t. 46, I) shows the feature most characteristic of the species: the presence of anthocyanin pigmentation on both surfaces of the leaf. The only case in which this character

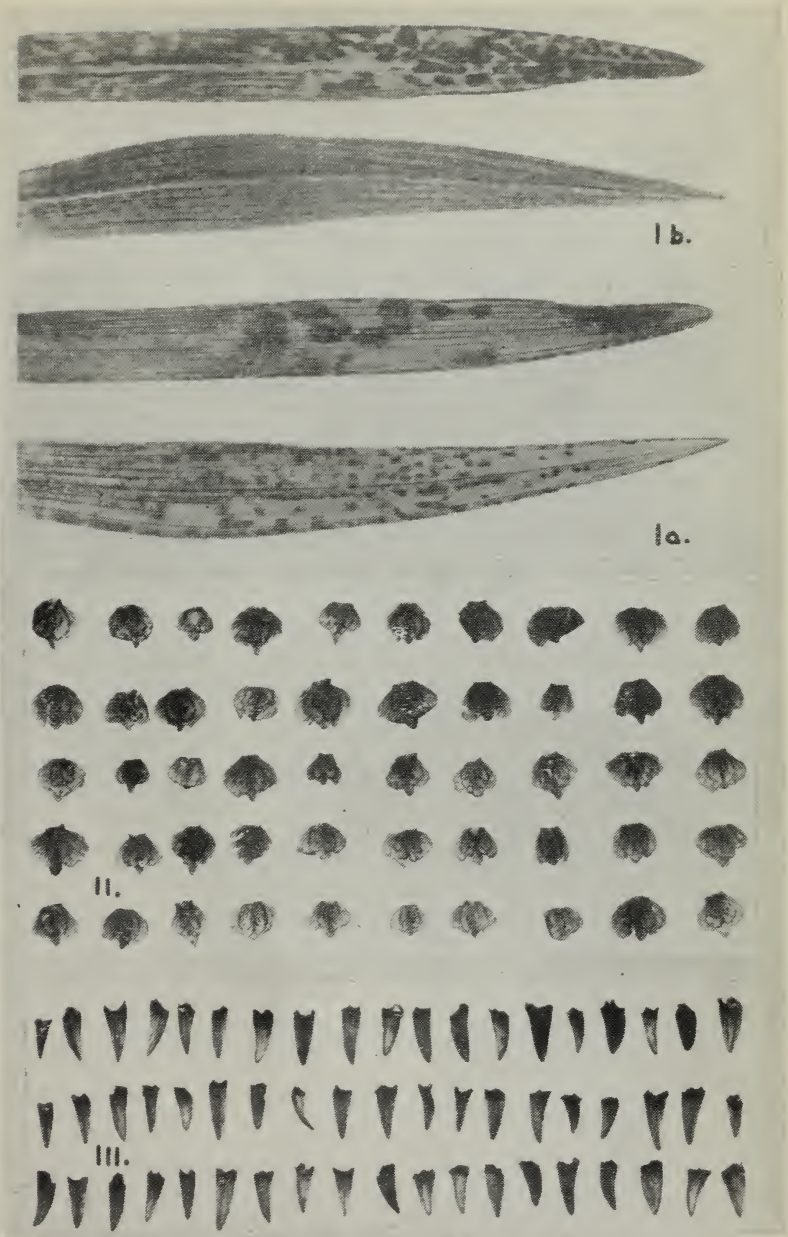


Plate I i (a) Upper and (b) lower surfaces of a pair of leaves from two different plants of *O. cruenta*. (Natural size).
ii Lips from homologous flowers from fifty different individuals (*c.* natural size).
iii. Spurs from fifty-seven different individuals (*c.* natural size).

is illustrated is in a supplementary plate (t. 170, II) of *Orchis salina* Turcz. This figure might well represent a form of *O. cruenta* Müll., and it is significant that *O. salina* is placed in the supplementary text with *O. haematodes* Reichb. p. under 1, *Incarnatae verae*, a. *lanceata* (that is, *O. cruenta* Müll. sensu Reichb. p.).

Five varieties of *O. cruenta* Müll. are recognised by L. M. Neuman (1909) in his treatment of the Scandinavian forms of the species. These are: α *subelliptica*, β *subtriangularis*, γ *brevifolia*, δ *lanceolata* and ε *haematodes*. The first two are broad-leaved forms (maximum leaf width 2-2.5 cm.), differing from each other in a labellum character. Vars. *brevifolia* and *lanceolata* are narrow-leaved plants (maximum leaf width 1-1.5 cm.), the former with exceedingly short, recurved leaves. Var. *haematodes* is a resuscitation of the elder Reichenbach's "*O. haematodes*," differentiated, according to Neuman's brief diagnosis, mainly through the possession of a greater number of bract-like leaves between the upper foliage leaf and the spike.

The continental range of *O. cruenta* was greatly extended by Pugsley's discovery in 1933 of a plant undoubtedly connected with that of Müller in two regions near Zermatt in Switzerland. Two years later the plant was found in Graubünden by Gsell (1935). Pugsley's description of the Swiss plant (Pugsley, 1935) is apparently based upon selected specimens, and gives little indication of variation—certainly it is not adequate to associate the Swiss race with any particular one of Neuman's varieties. That of Gsell gives some useful biometrical data and an indication of the range of variation of certain characters. The most recent continental find has been that reported by Wilmott (1938), who identified the plant in material from the French Alps. The excellent photograph which accompanies his description portrays a plant which may have affinities with Neuman's var. *subtriangularis*. The interrelationships of the continental forms are discussed further below.

Brief consideration must be given here to certain erroneous former records of *O. cruenta* from the British Isles. The first record of the species from a British locality occurs in a note by H. Goss (1899) in which it is stated to occur on the Cumberland fells at an altitude of 1000 ft., the identification having been made by Rolfe. Druce (1910) subsequently recorded the plant from Teesdale, Durham, again on the basis of identifications made by Rolfe. In 1916, T. A. Stephenson reported *O. cruenta* from Hawkshead, N. Lancs., and from the Isle of Arran—"corroborated at Kew," presumably also by Rolfe. Druce apparently had some suspicion of these last records, since he saw differences between the plant concerned and that illustrated in Müller's original *Flora Danica* plate. All of these records preceded the establishment by the Stephensons in 1920 of their *Orchis purpurella* as a distinct species. After that date it became clear that all the previous records of "*Orchis cruenta*" from the British Isles referred to *O. purpurella*, and moreover that it had been the practice of certain continental authorities to refer plants of *O. purpurella* to *O. cruenta*, no doubt as

Vermeulen (1947) suggests, as the result of the misleading plate published of the latter species by the younger Reichenbach. This point was demonstrated by Druce (1920), for whom plants of *O. purpurella* were named as *O. cruenta* by Lindman. In a further elucidation of the relationship of *O. purpurella* with other marsh orchids, the Stephensons (1921) pointed out the marked differences between their plant and the *O. cruenta* of Müller. From examination of Druce's herbarium material, they decided that *O. cruenta* is nearer to *O. incarnata* (*O. latifolia* L. sec. Pugsl.) than to *O. purpurella*—" as compared with the minute dots of *purpurella* it has not only more angular markings, but also bright purple blotches on both sides of the leaves." They finally concluded (1922) that "it is now certain that previous records of *cruenta* from Britain are incorrect; the plants found must be assigned to *purpurella*." Druce had already reached this conclusion (1921), and had shown that the original record of Goss was at fault as a result of Rolfe's misnaming. He withdrew his own record for *O. cruenta* in Teesdale, stating that the plants there, too, fall under *O. purpurella* Steph.

The nomenclatural confusion which surrounds *O. cruenta* arises, as in the case of so many other dactylorchids, largely from the extreme inherent variability of the species. Among the dactylorchids, the observation of Camp and Gilly, in a recent discussion on the structure and origin of species (1943), applies with particular force: " the species is not necessarily a particular kind of organism; the species is a kind of population." To be of use in comparative studies, descriptions of taxonomic units within the group must necessarily take into account the range of variation found in natural populations.

The following description is based upon two random mass collections of more than one hundred individuals each from the colonies of *O. cruenta* on the limestone shores of Lough Carra and Lough Mask. For assistance in recording biometrical data I am indebted to Prof. A. R. Clapham and to Dr Y. Massey.

DESCRIPTION

Leaf characters.

Number. There are normally two or three membranous leaves ensheathing the stem just above the tubers. Counting the lowest green leaf as the first, and that below the first floral bract as the last, even though it may be bract-like, the distribution of the number of leaves per plant in the populations examined is as follows: 3 leaves, 1%; 4 leaves, 22%; 5 leaves, 68%; 6 leaves, 8%; 7 leaves, 1%. The modal class for leaf number among the Irish plants is thus 5, with about a third as many with 4.

Size and shape. The leaves are characteristically lanceolate or linear-lanceolate, slightly keeled and broadest about one-third of their length from the base. They are normally erect, slightly recurved, and dispersed regularly along the length of the stem. Population parameters for the dimensions of the largest leaf are as follows:

Length (from top of sheath to tip): Range, 5-15 cm.; mean, 8.42 cm.; standard deviation, 2.49 cm.

Width (at broadest point): Range, 0.9-2.1 cm.; mean, 1.25 cm.; standard deviation, 0.29 cm.

Marking. Leaf marking was absent from 35% of the plants examined. The majority of the remainder showed the extraordinary distribution of anthocyanin pigmentation exclusive to *O. cruenta* among the European orchids. The marking is of a reddish-purple or violet hue, dispersed in fine dots or larger spots and blotches, sometimes forming dark bars running parallel to the leaf venation, sometimes forming fields or zones of colour interrupted only occasionally by small rectangular greenish islands, and often covering the entire leaf surface. Except in about 2% of the individuals examined, this marking was repeated on both surfaces of the leaf. The pigment seems to be located in sub-epidermal cells on each surface, and the patterning on the two surfaces is thus not necessarily coincident. This point is illustrated in the photograph of upper and lower surfaces of a pair of leaves reproduced in Plate I, i. The intensity of pigmentation can only be assessed visually; separating the range of variation into five arbitrary classes and taking no account of variation in pattern, the distribution of the Irish plants is as follows: Nil, 35%; Light, 28%; Medium, 14%; Heavy, 12%; Very heavy, 11%.

Stem.

Measured from immediately above the tubers (the point at which the stem parts with a vertical pull at the level of the lower leaves) the stature of the plants examined varied from 19 to 46 cm. The mean of all plants was 31.42 cm., and the standard deviation, 4.80 cm. The stem is invariably hollow, the cavity usually exceeding half the total diameter. In those individuals with heavily marked leaves, the stem is generally suffused with a similar violet or purple coloration, particularly in the upper parts. In others it is striated or flecked with pigment, the markings being continuous with those of the upper leaves or floral bracts.

Inflorescence and flowers.

The inflorescence of Irish plants of *O. cruenta* is somewhat less dense than in native *O. latifolia* L. sec. Pugsl., and ranges in length from 3 to 7.5 cm., with 11 to 42 flowers. The bracts, which are spotted like the upper leaves, exceed the flowers in the lower part of the inflorescence. The flowers are small and possess a range of lilac-purple colours, with no trace of the flesh or maroon tint of *O. latifolia*. The lateral sepals are erect or slightly reflexed, marked with a pattern of fine dots or short bars. The labellum is entire or obscurely tri-lobed, often reflexed laterally in the fresh state. The range of variation in shape is illustrated in Plate I, ii. The dimensions are as follows:

Width (at broadest point): Range, 4.5-9.0 mm.; mean, 6.38 mm.; standard deviation, 1.04 mm.

Length (measured from spur mouth): Range, 4.25-7.50 mm.; mean, 5.82 mm.; standard deviation, 0.74 mm.

The spur is thick, curved and bluntly conical (Plate I, iii). The dimensions are:

Length: Range, 5.5-9.25 mm.; mean, 7.65 mm.; standard deviation, 0.76 mm.

Width (flattened): Range, 2.0-4.0 mm.; mean, 2.91 mm.; standard deviation, 0.47 mm.

The ovaries are strongly ridged, and commonly flecked with reddish-purple in the manner of the floral bracts and upper part of the stem.

CYTOLOGY.

Root- and tuber-tips were fixed in the field in Lewitsky's modification of Navaschin's solution, and sections were cut at 12 μ. The chromosomes of the dactylorchids are small, and tend to lie in compact groups, or even to form chains (e.g., *O. ericetorum*; Hagerup, 1944). This makes accurate determination of their number difficult. The disadvantage may to some extent be overcome by staining with Johansen's methyl violet method, and carrying the differentiating and destaining action of the final picric-alcohol and clove oil baths to the point where only the outlines of the chromosomes remain visible. Overlapping and clumped groups may then be separated into their individual components with far greater ease than when the chromosomes are stained deeply and uniformly. Forty plates were counted in material from four plants. The chromosome number was found uniformly to be

Fig. 1. *Orchis cruenta* Müll.: metaphase plate from root tip ×*c.* 3000.

2n = 40. A well-spread metaphase plate is illustrated in fig. 1. This finding is in accordance with that of Heusser (1938) for Swiss material of *O. cruenta*, and places the plant in the diploid series to which belong the other members of Pugsley's *Latifoliae verae*.

O. CRUENTA IN RELATION TO OTHER BRITISH DACTYLORCHIDS.

With *O. latifolia* L. sec. Pugsl. (*O. incarnata* auct. mult.), *O. cruenta* forms the subsection *Latifoliae verae* of the subgenus *Dactylorchis*

Klinge in Pugsley's classification (1935). *O. latifolia* L. sec. Pugsl. is represented in the British Islands by a wide range of varieties, almost all of which are clearly distinguished from *O. cruenta* by the complete absence of leaf markings. As has been seen, populations of *O. cruenta* always contain a high proportion of individuals in which the characteristic marking is present on both sides of the foliage leaves, and in which the bracts and upper parts of the stem are "cruentate"—flecked with reddish-purple pigment. Other differences which distinguish *O. cruenta* from the *O. latifolia* forms are found in flower colour and shape, and in the size, shape and distribution of the leaves. The lilac-purple flower colour is quite distinct from the straw, flesh, salmon, crimson-red series of tones found in many *O. latifolia* forms (var. *Gemmana* Pugsl.; var. *ochroleuca* (Boll) Pugsl.; var. *coccinea* Pugsl.), and in fact is almost as distinct in the fresh state from the reddish-purple colours of the other *latifolia* varieties (var. *pulchella* (Druce) Pugsl. and var. *cambrica* Pugsl.). Closest to *O. cruenta* amongst the *O. latifolia* forms is var. *pulchella*, some populations of which contain individuals with light pin-point leaf spotting reminiscent of that found in *O. purpurella* T. & T. A. Steph. But the leaf marking in *pulchella* is restricted to the upper surface of the foliage leaves, never extending to the bracts or the stem. The labellum of *pulchella* is considerably larger than in *O. cruenta* (*c.* 8×8 mm., in contrast with *c.* 6×6.5), the leaves are broader, more recurved and more numerous, and the stem less fistular. The var. *pulchella* is, moreover, an early flowering plant of mildly acid sphagnum bog (frequently with *Sphagnum squarrosum* in Ireland), while *cruenta* flowers in late June and early July, and is apparently restricted to the highly calcareous type of marsh habitat described below.

Comparison with continental O. cruenta.

It is clear from the continental literature that *O. cruenta* is as variable throughout its range as are *O. latifolia* L. sec. Pugsl. and *O. majalis* Reichb. Nevertheless, there is a substantial body of agreement between the various descriptions of the species, and there can be little doubt that the Irish plant here described falls within the "Rassenkreis" to which the northern forms of Müller, Klinge and Neuman, and the Alpine forms of Pugsley, Gsell and Wilmott belong. As in the *O. majalis* complex, there seems to be a wide variation in leaf size and shape. The original plate of Müller portrays a rather broad-leaved plant, close to Neuman's var. *subelliptica* (the leaf dimensions given by Neuman for this variety, which was based upon plants from Frösön, Jämtland, are 6-7 cm. × 2 cm.). I understand from Dr H. Smith of Uppsala that the broad-leaved plant is the more common in southern Sweden. Jämtland was, however, also the source of the material upon which Neuman's varieties *subtriangularis* and *lanceolata* were based, the former with a leaf size given as 5-7 cm. × 2-2.5 cm., and the latter, 6-12 cm. × 1-1.5 cm. It is difficult to tell from Neuman's account how well defined were the populations to which these dimensions refer, and it should be noted that Vermeulen (1947) states that the material he saw from this important

Swedish locality showed a very wide range of variation in leaf width*. Klinge, presumably describing Russian material, quotes the dimensions of the largest leaf as 6-8 cm. × 1-1.5 cm.; dimensions which are accepted without modification in the accounts of Ascherson and Graebner (1907) and of Camus (1928-9). Gsell's dimensions for the Graubünden plants (5-9 cm. × 1.5-1.8 cm.) define a broad-leaved race, no doubt similar to that represented by the broad-leaved plant illustrated by Wilmott (1938). Summarising the above:

(1) Narrow-leaved and broad-leaved races of *O. cruenta* occur in the Scandinavian region, the former tending possibly to have a more northerly and the latter a more southerly distribution;

(2) the narrow-leaved form is probably the more common in northern Russia;

(3) the Alpine form is characteristically broad-leaved.

While the Irish plants show considerable variation in leaf width (0.9-2.1 cm.), the mean width is 1.25 cm., and the race must therefore be regarded as relatively narrow-leaved. If Neuman's varieties are accepted, then the Irish race is closest to his var. *lanceolata*.

DISTRIBUTION AND ECOLOGY

In Ireland, *O. cruenta* appears to be limited to suitable habitats around the lakes of the Galway-Mayo limestone basin. Its distribution in this area has been explored in some detail by Mrs H. Gough, Mrs D. Teacher and Major R. F. Ruttledge (June, 1950). The localities now known are as follows:

East Mayo (v.-c. H.26). Lough Carra: plentiful near Keel Bridge at the south end of the lake, extending up the west shore north of Partry and occurring on some of the islands; also plentiful at Cloonee and on the east shore north of Cloonee. Lough Mask: abundant at Aghinish, and occasional on the lake shore further north. Lough Corrib: occasional on the north-east shore near Castletown.

North Galway (v.-c. H.17). Occasional at Annaghdown, on the north-east shore of Lough Corrib.

The main continental range of *O. cruenta* (*sens. lat.*) lies between latitudes 55° and 65° N., although at the head of the Gulf of Bothnia and possibly in western Russia it approaches the Arctic Circle. The plant is now known from six or seven Alpine localities, following Pugsley's initial discovery of it near Zermatt in 1933. A record for a "race" of the species (*O. cruentus* B *Seemenii* Ascherson & Graebner, 1907) exists for a locality on the Isle of Borkum. Schulze (in Ascherson and Graebner, p. 721) considered this to be a form of *O. in-*

*My own measurements of leaf size made in July 1950 on 25 plants from a colony near Hammerdal in Jämtland, one of the type localities for Neuman's var. *lanceolata*, gave the following results: length 9-14 cm., mean 11.40 cm.; width 0.9-1.9 cm., mean 1.15 cm. In a collection of 100 plants from Omberg in Östergötland some 350 miles south of this locality, the dimensions of the largest leaf were as follows: length 6-14 cm., mean 9.24 cm., width 0.7-2.2 cm., mean 1.29 cm. The distinction between these two Swedish populations in this character is thus hardly significant.

carnata (*O. latifolia* L. sec. Pugsl.). This race is now extinct (*fide* Vermeulen). For reasons outlined above, the Scottish and northern English records quoted by Ascherson and Graebner, Camus, and other continental authors must now be disallowed.

The European distribution of the species, as now known, is thus as shown in the accompanying map, fig. 2. For the spot records of the

Fig. 2. *Orchis cruenta* Müll. : European distribution.

plant from the Scandinavian area I am indebted to Dr E. Hultén, who kindly supplied me with an advance map from his remarkable *Atlas* (1950).* To these I have added a record from Götland (Pettersson, 1947).

**O. cruenta* is placed by Hultén in his Group 14 : "North-European plants with a boreal-montane tendency", among the species *without* a central European range. Its presence in the Alps means that it should feature, rather, in the second section of this Group, in which are listed plants possessing central European (often sub-alpine) ranges in addition to their more extensive northern areas.

East of the area shown on the map, the range of the species extends through central and northern Russia, reaching, according to Nevski, east of Lake Baikal. Details of the eastern Siberian range are not available.

O. cruenta generally occurs in small colonies in calcareous marshes and fens, and occasionally in salt-marshes. In Ireland, as for example about Lough Carra, it is a member of an *open* association dominated by *Schoenus nigricans*. This occurs in a belt of varying width extending down to the water's edge, and is subject to frequent inundation. The substratum is a white, highly calcareous deposit, soapy in texture, with a pH ranging from 8.2-8.4 in the samples examined and a solubility in acid of 70-85% dry weight. Characteristic associates include *Ranunculus Flammula*, *Lythrum Salicaria*, *Cirsium dissectum*, *Anagallis tenella*, *Samolus Valerandi*, *Pinguicula vulgaris*, *Juncus acutiflorus*, *Scirpus pauciflorus*, and occasionally *Cladium Mariscus*. The plant rapidly thins out in the drier *closed* associations, at and just above the flood level, which have a richer orchidaceous flora including *Gymnadenia conopsea*, *Anacamptis pyramidalis*, *Orchis Fuchsii*, and, locally, *Epipactis palustris*.

The foregoing distributional data suggest that *O. cruenta* must be added to the problematical little group in the flora of the British Islands which Matthews (1937) has termed the Northern-Montane. This includes plants with a fairly wide lowland distribution in northern Europe which possess disjunct localities further south, mostly in sub-alpine areas. Other examples in the Irish flora with this type of distribution are *Potentilla fruticosa*, *Calamagrostis neglecta* and *Salix phylicifolia*. The comparative sparsity of *O. cruenta* in central Europe suggests that it is of northern origin, and that the Alpine and Irish colonies represent relict stations from late glacial times when the species probably occupied a more extensive region south of the glaciated zone. During the ensuing climatic amelioration the main mass of the species is likely to have migrated northwards to its present station, while the immigration of a vigorous lowland flora eliminated the species in its southern stations except for isolated areas in which it is fitted by specialised ecology to meet competition. In Switzerland, one may suppose that such conditions are found in calcareous sub-alpine marshes. Gsell emphasises the fact that the Graubünden stations are all above the 1800 m. level, that is, at a greater altitude than that at which *O. incarnata* is commonly found. In Ireland, the present distribution may be explained on the assumption that survival was possible in calcareous marsh areas due to the early check to the immigration of potential competitors caused by the opening of the English Channel and the widening of the Irish Sea.

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ABSTRACTS FROM LITERATURE

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SYSTEMATIC, Etc.

6/14. Ranunculus auricomus L. Schwarz, O., 1949, Beiträge zur Kenntniss kritischer Formenkreise im Gebiete der Flora von Thüringen, *Mitt. Thüring. Bot. Ges.*, **1** (1), 120. *Ranunculus auricomus* L. has been shown to be a collective species, with several constant apomictic microspecies. Nine are recorded for Thuringia and separated by a key.—[A.H.G.A.]

39/1. Cardamine pratensis L. Clausen, R. T., 1949, Checklist of the Vascular Plants of the Cayuga Quadrangle, 42°-43° N., 76°-77° W., *Cornell Univ. Agr. Exp. Sta.*, Mem. 291, 8-9. Two subspecies are distinguished: subsp. *typica* Clausen occurs in dry situations and subsp. *palustris* (Wimm. et Grab.) Clausen in moist, boggy places. Although they have geographical pattern of subspecies in North America, in Europe their relationships are more complex.—[D.E.A.]

39/1. Cardamine pratensis L. Hussein, F., 1948, Chromosome number of Cardamine pratensis, *Nature*, **161**, 1015. The normal plant of damp meadows constantly has 2n = 56. Plants with semi-double flowers have been found in fifteen localities in wet places, chiefly in the North of England. They too have 2n = 56. Plants with 2n = 30 seem to be characteristically from southern England. An ecological difference found by Lövkvist holds good in most cases: the large plant (2n = 30) is characteristic of damp banks, whereas the smaller darker-leaved plant grows in wet meadows.—[D.E.A.]

44. Erophila. Matuszkiewicz, W., 1948, Taxonomic Researches on Erophila verna DC., *Ann. Univ. Mariae-Curie*, Lublin, **3**, 19-47. (Polish with English summary). The author concludes that there is little statistical correlation between the characters.—[A.H.G.A.]

61/3. Lepidium Draba L. Shove, R. F., 1948, Thanet Weed (Cardaria Draba), *School Nature Study*, **43**, 11-12. A short account of its history in Britain, morphology and biology.—[A.E.W.]

96. Silene. Marsden-Jones, E. M., & Turrill, W. B., 1948-9, Researches on Silene maritima and S. vulgaris, XXVII, XXVIII, XXIX, XXX, *Kew Bull.*, **1948**, 29-33, 33-42, 253-263, 264-276; XXXI, **1949**, 319-339. The first paper deals with the examination of Swedish material of *S. maritima*. 429 plants were grown and scored and the authors conclude that they are all to be classified into *S. maritima*, resulting from the continued back-crossing of a *S. maritima* × *S. vul-*

garis F1 with *S. maritima*; this would result in " infiltration " of *S. vulgaris* genes into a *S. maritima* population. The second paper deals with *S. vulgaris* material from the Pyrenees. The genetic behaviour of populations derived from this material is described; of particular interest is the genetic behaviour of a short bristly type of indumentum, the very inflated calyx, certain capsule characters usually associated with *S. maritima* and a modification of the tubercled character of the coat. Paper XXIX gives the results of three crosses between a plant of *S. maritima*, peculiar in having long cylindrical calyces, and two plants of *S. vulgaris*. It is shown how very rarely either grandparental habit appears in the F2 generation. Paper XXX describes work on crosses between *S. vulgaris* plants from Loch Tay and both *S. maritima* and *S. vulgaris* plants of different origin. F2 families from interspecific crosses showed a high degree of sterility. Paper XXXI suggests that mutation and selection connected with the car-age and its oncoming led to the isolation of *S. maritima* in north Europe.—[K.S.H.]

112/16. Hypericum linariifolium Vahl. Sandwith, N. Y., 1947, *Trans. Radnor Soc.*, **17**, 13. Its occurrence in Radnorshire is discussed.—[A.E.W.]

117. Malva. Hedlund, T., 1949, Notes on the Appearance of New Biotypes Closely Related to Malva parviflora L., *Hereditas*, **35**, 507-520.

123/1. Tilia platyphyllos Scop. Burchell, J. P. T., & Erdtman, G., 1950, Indigenous T. platyphyllos in Britain, *Nature*, **165**, 411. Peat from Addington, Kent (v.-c. 16), contained pollen-grains of *Tilia cordata* and *platyphyllos* (frequency 10%, proportions 75: 5), besides alder, birch, hazel, oak, elm, and other trees and herbs in small amounts. The peat layer is assigned to the neolithic period.—[D.P.Y.]

127/3. Geranium sylvaticum L. Lundman, B., 1948, Some Notes on the Regional Variation of Flower Colour in Geranium silvaticum L., *Svensk Bot. Tidskr.*, **42**, 153-157 (in Swedish). Light-coloured flowers are common in the northern parts of Sweden, in Norway and in parts of Finland, but rather rare in southern and central Sweden, where they have been found only in mountain districts.—[A.H.G.A.]

185. Rubus L. Bailey, L. H., 1949, Rubus Studies, *Gentes Herbarum*, **7**, 480-526. The author gives an account of the theory of species in *Rubus*. He places *R. Leesii* Bab. under *R. idaeus* var. *obtusifolius* Willd.—[A.H.G.A.]

186. Dryas. Porsild, A. E., 1947, The Genus Dryas in North America, *Canad. Field-Nat.*, **61**, 175-192. The North American species are revised and compared with those of Eurasia.—[D.E.A.]

189/8. Potentilla procumbens Sibth. Dix, W. L., 1949, Potentilla procumbens in the United States, *Rhodora*, **57**, 390-391. *P. procumbens* Sibth. is recorded as an escape. The correct name is said to be *P. anglica* Laich.—[A.H.G.A.]

195. Sorbus. Hedlund, T., 1948, Om uppkomsten av nya livstyper inom släktet Sorbus (Concerning the Rise of new Biotypes within the genus Sorbus), *Bot. Not.*, **1948**, 381-391.

199/17. SAXIFRAGA GRANULATA L. Jones, E., & Turrill, W. B., A quantitative Study of Petal Size and Shape in Saxifraga granulata L., *J. Genetics*, **48**, 206-218. The paper deals with the Hog's Back population. Environmental conditions have little or no influence on the L/B ratio of the petals, but this varies with the age of the flowers. Female flowers, without viable pollen, were not frequent in the material studied.—[A.H.G.A.]

207. RIBES. Hedlund, T., 1948, Om Ribes vulgare och Ribes rubrum, *Bot. Not.*, **1948**, 39-48. The cultivated plants of *Ribes* called *R. rubrum* by Linnaeus and characterised by " floribus planiusculis " and by separate antheral spaces on the stamens were given the name *R. vulgare* by Lamarck in 1789. *R. rubrum* L. has been used to signify a collective species having campanulate flowers with wholly inferior ovaries and stamens with the antheral spaces close together. The subspecies of *R. rubrum* L. which differ mainly in degree of pilosity and are arranged in order of decreasing pilosity are *R. pubescens* (Sw.) Hedl., *R. scandicum* Hedl., *R. glabellum* (Trautv. et Mey.), and *R. glabrum* Hedl. They are found mainly in northern Europe and northern Asia. A key to some species of *Ribes*, 8 in number, is given.—[A.E.W.]

207/2. RIBES NIGRUM L. Vaarama, A., 1948, Cryptic Polyploidy and Variation of Chromosome number in Ribes nigrum, *Nature*, **162**, 782. *R. nigrum* has been found to have an oscillating chromosome number varying from 4 to 32. The most frequent number is diploid 2n = 16. All numbers divisible by four are more frequent than might be expected. If the basic number for the genus is x = 4, the recent species are presumably derived tetraploids. The meiosis of certain *Ribes* hybrids indicates that hybridization and amphidiploidy have played a part in the speciation of this genus.—[D.E.A.]

220/1. EPILOBIUM ANGUSTIFOLIUM L. Fernandes, R., Uma Espécie de Epilobium nova para a Flora de Portugal, *Bot. Soc. Brot.*, ser. 2, **22**, 5-14. *Epilobium angustifolium* L. var. *brachycarpum* (Leight.) is figured, described and recorded as new to the flora of Portugal. The Portuguese plant is said to agree with specimens from Colinton Woods, Edinburgh, collected by Syme.—[A.H.G.A.]

223. OENOTHERA. Parrot, A. G., 1948, Les Onagres (Oenothera L.) au Pays Basque français, *Bull. Soc. Hist. Nat. Toulouse*, **83**, 83-87.

247. APIUM; 253, SIUM. Berton, A., 1947, Sium et Helosciadium. Tussilago et Petasites. Structure des Petioles; determination par les feuilles, *La Feuille des Naturalistes*, N.S. **2**, 95. *Helosciadium* has fewer leaflets on the radical leaves (4-6 pairs). The leaflets of the first pair are at least as large as the others (the contour of the leaf is more or less triangular). No articulations on the petiole. No inverted (inversé) vascular bundles. Round cavity in transverse section. *Sium angustifolium* has 6-12 pairs of leaflets. The lowest pair smaller than the others (contour of leaf lanceolate). Rhachis articulate. Central cavity blocked at the articulation. *Petasites*: petiole angular with two

wings on ventral surface. Numerous vascular bundles in transverse section. *Tussilago*: petiole without angles or wings. Vascular bundles in a single arc. *Petasites fragrans* is similar to *Tussilago*, but there are vascular bundles within the main arc.—[A.H.G.A.]

258/1. Chaerophyllum aureum L. Håkansson, A., 1948, Syncytiebildning i anthererna av Chaerophyllum aureum, *Bot. Not.*, **1948**, 425-429. An unusual kind of pollen sterility is discussed. "Meiosis is as a rule regular with 11 II's at diakinesis, but at the end of the second division disturbances set in. In most cases no separate pollen cells are formed, the four 'tetrad' nuclei remaining together in the same cell. The nuclei increase in size and often a vacuole is found as in a normal pollen grain. Often larger syncytia are formed through fusion of a different number of 'tetrads.' Germinable fruits are found, and as agamospermy does not occur, they must be the result of pollination from pollen that must be formed rarely."—[A.E.W.]

277/2. Heracleum Sphondylium L. Duwen, J. M., 1949, De Bereklaun, *De Levende Natur*, **52**, 70-73. The paper illustrates and discusses the dissected forms.—[A.H.G.A.]

295/1. Rubia peregrina L. Guillaume, A., 1948, La limite de répartition du Rubia peregrina, *Bull. Soc. Bot. Franç.*, **95**, 265-272. The writer seeks to demonstrate that the areas occupied by *Rubia peregrina* and *Ruscus aculeatus*, which are south-west European species with a range from Southern England to Northern Italy, are mainly determined by their past history rather than by climatic factors. Salisbury's (1926, The Geographical distribution of plants in relation to climatic factors, *Geographical Journal*, **48**, 312) theories are criticised.—[A.H.G.A.]

296/5. Galium pumilum Murray. Ehrendorfer, F., Zur Phylogenie der Gattung Galium. I. Polyploidie und geographisch-ökologische Einheiten in der Gruppe des Galium pumilum Murray (Sekt. Leptogalium Lange sensu Rouy) im österreichischen Alpenraum, *Österr. Bot. Zeitschr.*, **96**, 109-138.

300. Sherardia. Garjeanne, A. J. M., 1948, Sherardia, *De Levende Natur*, **51**, 163-168.

301. Valeriana. Walther, E., 1949, Zur Morphogie und Systematik des Arzneibaldrians in Mitteleuropa, *Mitt. Thüring. Bot. Ges.*, Beiheft, **1**, 7-105. A revision of the Genus *Valeriana* Section *Officinalis* based on cytology and herbarium specimens. Four species are recognised and their distribution shown on a map. A fifth, *V. pratensis* Dierb., is confined to the Rhine Valley. Three of these are reported from Britain, while the fourth, *V. sambucifolia*, has a more easterly range from Scandinavia to Jugo-Slavia. The species are separated as follows:—

A. Plants with stolons above ground ("flagellen") and subterranean ("stolonen"). Epidermal cells of the upper surface of the leaf with wavy walls ("stark gewellt"). Leaflets at right angles to the rhachis. Flowers 4-8.3 mm. long. Pollen grains 52-65μ. Fruit glabrous and 4-5 mm. long.
Series *Sambucifoliae*.

B. Plants early-flowering, small, 40-80 cm. Leaves in the middle of the stem with (2)3-4(5) pairs of leaflets. ..... 1. *V. sambucifolia.*

BB. Plants late-flowering, usually 80-150 cm. Leaves in the middle of the stem with (2)4-6(8) pairs of leaflets, under surface with long hairs. 2. *V. procurrens.*

AA. Plants with stolons subterranean or almost wanting. Epidermal cells of the upper surface of the leaf with almost straight walls ("wenig gebogen"). Leaflets making an acute angle with the rhachis. Flowers 2-5.7 mm. long. Pollen grains 37-50μ. Fruits 2-4.4 mm. long. Series *Collinae.*

B. Under surface of leaves with long hairs.

C. Plants early-flowering, with short stolons. Leaves in the middle of the stem short-stalked, with (6)7-12(14) pairs of leaflets. ..... 3. *V. collina.*

CC. Plants late-flowering, almost without stolons, 70-150 cm. Leaves in middle of stem long-stalked, with 6-9 pairs of leaflets. Fruit always glabrous. ..... 4. *V. exaltata.*

BB. Under surface of leaves glabrous or with short bristles. Plants early-flowering, usually without stolons, 50-100 cm. Leaves in middle of stem with 6-8 pairs of leaflets. ..... 5. *V. pratensis.*

The British records and the chromosome numbers are :—

1. *V. sambucifolia* Mikan (non British). n=28.

2. *V. procurrens* Wallroth (*V. sambucifolia* auct.). n=28.

V.-c. 6. N. Som. : Cheddar Gorge, *Skalińska & Sandwith*; *Ross-Craig, Burtt & Sealy.*
9. Dorset : Wareham, hedgebank, *Makins.*
11. S. Hants. : S. of Minstead, New Forest, *Ross-Craig, Burtt & Sealy.*
17. Surrey : towing-path above Kew, *Fraser.*
22. Berks. : Kennington, near Oxford, wet places, *Hubbard.*
23. Oxon. : near Shipton-on-Cherwell, *Turrill.*
30. Beds. : King's Wood, Heath and Reach, *Milne-Redhead.*
33. E. Glos. : Mercombe Wood; Perrott's Brook, by roadside at bottom of hill and by R. Churn, *Sprague*; Chescombe Wood, *Sprague & Skalińska.*
76. Renfrew : Earn Water, between Mearns and Fenwick, *Mackechnie.*
80. Roxburgh : Newcastleton, in state forest. *Summerhayes.*
104. Skye : near Portree (Staffin Road). *N. & H. M. Montford.*
H.1. Kerry : between Ross Island and mouth of the R. Flesk, Killarney, *Ross-Craig, Burtt & Sealy.*

3. *V. collina* Wallroth (*V. officinalis* L. emend. Maillefer). n=14.
6. N. Som. : Leigh Woods, *J. W. White.*
17. Surrey : Hascombe, *E. S. Marshall*; chalkpit, south of West Clandon, *Britton*; Mickleham Downs, in open chalk pasture, *Sandwith.*
25. E. Suffolk : Burgate, *E. S. Marshall.*
29. Cambridge : Cherry Hinton, *Babington.*
30. Beds. : Knotting, *Milne-Redhead.*
39. Stafford : limestone, Manifold Valley, *Edees*; Biddulph, Hb. Haussknecht; "Kuypersly", Hb. Haussknecht.

4. *V. exaltata* Mikan. n=7.
23. Oxon. : marsh near Slade's Bottom, Woodstock district, *Hubbard & Turrill.*

5. *V. pratensis* Dierbach (non British).

Hybrid *V. collina* × *V. procurrens.*
6. N. Som. : Avon Gorge under Leigh Woods, *Skalińska & Sandwith.*
17. Surrey : Clandon Downs, *Wallace*; Sheerwater, Byfleet, *Fraser.*
23. Oxon. : damp valley bottom near Kiddington, *Turrill.*
24. Bucks. : chalk slopes above High Wycombe, *Sandwith.*
33. E. Glos. : Lower Hilcot, *Sprague & Skalińska.* [A.H.G.A.]

[The spelling of the British localities has been checked by the specimens at Kew by Mr N. Y. Sandwith.—A.H.G.A.]

320. ERIGERON. Cronquist, A., 1947, A revision of the North American Species of Erigeron north of Mexico, *Brittonia*, **6**, 121-302. *E. canadensis* is placed in the genus *Conyza*, the chief generic difference being in the numbers of central hermaphrodite flowers, which are stated to be few in *Conyza* and many in *Erigeron*. Three North American varieties of *E. acris* are described.—[K.S.H.]

370/4. CHRYSANTHEMUM LEUCANTHEMUM L. Gombault, R., 1948, Notules sur la flore française de l'Ouest, *Bull. Mus. Paris*, **20**, 478-480. Describes *Chrysanthemum Leucanthemum* var. *odoratum* with a scented root and trimorphic leaves from Basses-Pyrénées.—[A.H.G.A.]

379. TUSSILAGO; 380, PETASITES. See 247; 253.

396/2. CIRSIUM VULGARE (Savi) Ten. Arènes, J., 1948, Les races françaisés du Cirsium vulgare (Sav.) Ten., *Bull. Soc. Franç. Ech. Pl. Vasc.*, **1947**, 42-45. The species is subdivided into three subspecies:—

Apex of median and outer bracts of capitulum 10-15 mm. long, erecto-patent, arcuate or recurved after flowering, tipped by a strong spine 3-7 mm. long ..... subsp. *crinitum* (Boiss.) Rouy

Apex of median and outer bracts of capitulum 5-10 mm. long, erect, erecto-patent or patent before flowering, sometimes afterwards, more or less arcuate:—

Leaves concolorous or subconcolorous, glabrous, glabrescent, pubescent or more or less arachnoid (?) beneath. Spines of involucral bracts 1-5 mm. ..... subsp. *Savianum* J.Ar.

Leaves not concolorous, strongly araneo-tomentose or woolly on the lower surface ..... subsp. *silvaticum* (Tausch.)

These subspecies are further subdivided into varieties.—[A.H.G.A.]

396/4. CIRSIUM ACAULON (L.) Weber. Arènes, J., 1948, Les races françaisés du Cirsium acaule (L.) Scop., *Bull. Soc. Franç. Ech. Pl. Vasc.*, **1947**, fasc. 1, pt. 2, 38. The species is subdivided as follows:—

Leaves with rather numerous more or less flat lobes which are patent or erecto-patent. Marginal spines whitish, medium, not erect. Rosettes solitary or united in small tussocks ..... var. *vulgare* Naeg.

Stem short or wanting (5 cm. or less)

Capitulum rounded and more or less truncate at base ..... subvar. *vulgare* J.Ar.

Capitulum attenuate at base ..... subvar. *araricum* (Gaud.) J.Ar.

Stem exceeding 5 cm.

Capitulum rounded and more or less truncate at base ..... subvar. *collivagum* (Gaud.) J.Ar.

Capitulum attenuate at base ..... subvar. *disjunctum* (Gaud.) J.Ar.

Leaves with many contiguous lobes separated by deep sinuses with thickened margins. Marginal spines erect, yellowish, long and numerous. Outer bracts of capitulum more cartilaginous and stiff. Rosettes numerous, united in large irregular tussocks .... var. *gregarium* (Boiss.) Briq. & Cav. [A.H.G.A.]

396/8. CIRSIUM ARVENSE (L.) Scop. Arènes, J., 1948, Les races françaises du Cirsium arvense (L.) Scop., *Bull. Soc. Franç. Ech. Pl. Vasc.*, **1947**, fasc. 1, pt. 2, 39-40. The species is subdivided into two subspecies:—*eu-arvense* J. Ar. (glabrescent) and *incanum* (Georgi) J. Ar. (leaves pubescent beneath). These are further subdivided into varieties and subvarieties.—[A.H.G.A.]

423. TARAXACUM. Tschermak-Woess, E., 1949, Diploides Taraxacum vulgare in Wien und Niederösterreich, *Österr. Bot. Zeitschr.*, **96**,

56-63. The *Taraxaca* found near Vienna include both triploid and diploid forms of the *T. vulgare* and *T. laevigatum* groups. The diploid form of *T. vulgare* is not apomictic. The pollen-grains and stomata are larger in the triploid forms than in the diploid.—[A.H.G.A.]

423. TARAXACUM. Chevalier, A., 1948, Essai élémentaire sur les Taraxacum de la flore de France, *Bull. Soc. Bot. France*, **95**, 257-259. The author states that the diploid chromosome numbers may be 16, 24, 32, 40 and 48. Nine sections are keyed out.—[A.H.G.A.]

445/1. CALLUNA VULGARIS Salisb. Poel, L. W., 1949, Germination and development of heather and the hydrogen ion concentration of the medium, *Nature*, **163**, 647-648. Germination and subsequent development of heather seeds on an artificial medium (agar) is optimum at pH 4.—[D.P.Y.]

458. ARMERIA. Lawrence, G. H. M., 1947, The Genus Armeria in North America, *Amer. Midl. Nat.*, **37**, 757-779. It is believed that the circumboreal thrifts of the Old and New Worlds represent a single polymorphic species, *A. maritima* (Mill.) Willd.; that a single element of this species, var. *sibirica* (Turcz.) Lawr., is essentially circumboreal, and that the plants of the southerly projecting ranges represent evolutionary developments of it. The author has been unable to treat *A. vulgaris* Willd. as specifically distinct from *A. maritima*. The genus does not afford an abundance of sharply differentiated morphological characters. Despite Druce's contention in 1901 that the vesture of the calyx-tube is a reliable character, it was found that, while it may be reliable in the separation of some of the more stable species, it is very variable in the more polymorphic units. Several geographical races of var. *typica* Lawr., which is limited in America to South Greenland, can be discerned in Old World populations; var. *purpurea* (Mert. et Koch) Lawr. is equivalent to *A. vulgaris* Willd. The differences between these two varieties may be tabulated as follows:—

Outer involucral bracts more than half as long as the inner ones, usually mucronate; inner bracts mucronate to mucronulate and occasionally obtuse; calyces with intercostal spaces glabrous or pubescent; leaves usually 1 mm. wide or less ..... var. *typica* Lawr.

Outer involucral bracts usually shorter than the inner ones, obtuse; inner bracts acute or obtuse; calyces with intercostal spaces glabrous; leaves usually 1.5 mm. wide or more ..... var. *purpurea* (Mert. et Koch) Lawr.

Other varieties occurring in America are described.—[D.E.A.]

460. PRIMULA. Smith, W. Wright, and Fletcher, H. R., 1948, An account of the genus *Primula*: Section *Vernales* Pax., *Trans. and Proc. Bot. Soc. Edin.*, **34**, 402-468. *P. elatior*, *P. veris*, and *P. vulgaris* are dealt with, their hybrids and described forms and varieties are enumerated, together with brief notes on their characteristics.—[A.E.W.]

476. MICROCALA. Garjeanne, A. J. M., 1949, Microcala, *De Levende Natur*, **52**, 104-110.

511/2. CALYSTEGIA SYLVESTRIS (Willd.) R. & S. Hylander, N., 1949, Calystegia silvestris, en förbisedd kulturflykting i Sveriges och Danmarks flora, *Bot. Not.*, **1949**, 148-156. The occurrence as a

naturalised garden escape of a pink-flowered form in Sweden and Denmark is discussed. This form had hitherto been confused with the corresponding pink-flowered form of *C. sepium* (L.) R. Br., var. *colorata* (Lge.) which the author finds indistinguishable from the var. *americana* (Sims) Kitag. This variety is considered to be only sub-spontaneous. The first record for Sweden of *C. sepium* var. *colorata* made in 1876 proves to be the pink-flowered form of *C. sylvestris*.—[A.E.W.]

515. Cuscuta. Denffer, D. von, 1948, Über die Bedeutung des Blühtermins der Wirtspflanzen von Cuscuta Gronovii Willd. für die Blütenbildung des Schmarotzers, *Biol. Zentralbl.*, **67**, 175-189. On certain hosts the Cuscuta takes over the long or short day character of the stock.—[A.H.G.A.]

515/2. Cuscuta europaea L. Verdcourt, B., 1948, Notes on the Scottish Records of Cuscuta europaea, *Trans. and Proc. Bot. Soc. Edin.*, **34**, 469-471. It is considered that the five certain occurrences of this species in Scotland, from the counties of South Aberdeen, Edinburgh, Roxburgh and Perth were all introductions.—[A.E.W.]

517. Solanum. Stebbins, G. L., & Paddode, E. F., 1949, The Solanum nigrum complex in Pacific North America, *Madroño*, **10**, 70-81. Several species have been included under *S. nigrum*. They have different chromosome numbers and often hybridise with difficulty. The true *S. nigrum* L. has a chromosome number 2n = 72, and, though widespread in Europe, is an uncommon introduction in America. It is replaced in N. America by *S. americanum* Mill., which has an umbelliferous (not subracemose) inflorescence and smaller seeds and stamens. *S. nodiflorum* Jacq. is the pantropic representative of *S. nigrum*, while *S. Douglasii* Dunal is common in western North America. *S. villosum* Mill. is a tetraploid (2n = 48) species found in Europe and sometimes introduced into the U.S.A. *S. furcatum* Dunal and *S. sarachoides* Sendt. are introduced species, and the latter has become widespread in U.S.A. It is distinguished by its green berry with large seeds and the swelling of the calyx after flowering. *S. furcatum* Dunal is a sparsely pubescent plant with bifurcate inflorescences, deflexed peduncles, large flowers and comparatively few seeds in the berries.—[A.H.G.A.]

543. Veronica. Garjeanne, A. J. M., 1948, Veronica, *De Levende Natur*, **51**, 101-108.

569. Glechoma. Kuprianova, L., 1948, The genus Glechoma L. and its species, (Russian), *Bot. Zhurn. SSSR*, **33**, 230-238. Five species are included in the revision. *Glechoma hirsuta* W. & K. is maintained as a species, but is not recorded from Britain. The map shows it as confined to S.E. Europe, so presumably the British records are excluded.—[A.H.G.A.]

596. Amaranthus. Contré, E., 1947, Un nouvel hybride d'Amaranthus: ×Amaranthus Ralletii E. Contré (A. retroflexus L. × A. Boudronii Thell.), *La Feuille des Naturalistes*, N.S., **2**, 11. Found in a garden at Paizay-le-Tort (Deux-Sèvres) with the parents.—[A.H.G.A.]

596. AMARANTHUS. Kloos, A. W., 1949, Dix espèces d'Amaranthus nouvelles pour la flore belge, *Bull. Jard. Bot. Brux.*, **19**, 243-250. The author records and describes several species. England figures in the distribution for *A. quitensis* H.B.K. and *A. Dinteri* Schinz var. *uncinatus* Thell.—[A.H.G.A.]

600/4. CHENOPODIUM HYBRIDUM L. Fernald, M. L., 1949, Chenopodium hybridum L. var. Stanleyanum (Aellen) comb. nov., *Rhodora*, **51**, 92. The common American representative is C. *hybridum* L. var. *gigantospermum* (Aellen) Rouleau, with seeds 1.5-2 mm. Those of var. *Stanleyanum* are 2-3 mm.—[A.H.G.A.]

615. POLYGONUM. Garjeanne, A. J. M., 1948, Varkensgrasbloempfer, *De Levende Natur*, **51**, 17-22.

618. RUMEX. Rechinger, K. H., 1948, Beiträge zur Kenntnis von Rumex, IX, *Candollea*, **11**, 229-241. Describes ×*R. eriogenus* (*R. cristatus* DC. × *R. Patentia* L.) from near Vienna as new. Redescribes ×*R. Trimenii* Hausskn. (*R. pulcher* L. × *R. rupestris* Le Gall) from White Sand Bay, E. Cornwall. In notes on nomenclature, *R. longifolius* DC. is substituted for *R. domesticus* Hartm., and recorded from Scotland. *R. cristatus* DC. non Fries replaces *R. graecus* Boiss. & Heldr., and is recorded from Kew Bridge. *R. altissimus* Wood is recorded from Colchester and Middlesex, and *R. fueginus* Phil. from Galashiels and Glasgow.—[A.H.G.A.]

622. ARISTOLOCHIA. Prell, H. H., 1948, Uitbreiding van de Pijpbloem, *De Levende Natur*, **51**, 116-121 and 135-141.

625/1. HIPPOPHAE RHAMNOIDES L. Darmer, G., 1948, Neue Beiträge zur Oekologie von Hippophaë rhamnoides L., *Biol. Centralbl.*, **67**, 342-361. The map shows that this is a coastal species in northern Europe, but occurs inland in South Europe and Central Asia.—[A.H.G.A.]

633/6. ULMUS STRICTA Lindl. var. SARNIENSIS (Loud.) Lawrence, G. H. M., New Combinations and names of cultivated plants, *Gentes Herbarum*, **8**, 77. The names include *Ulmus carpinifolia* var. *sarniensis* (Loud.) Bailey, based on *U. campestris β sarniensis* Loud., and including *U. foliacea* var. *Wheatleyi* Rehd.—[A.H.G.A.]

641/1. MYRICA GALE L. Bond, G., 1949, Root nodules of Bog Myrtle or Sweet Gale, *Nature*, **163**, 730. Experiments in artificial growth media confirm that the root nodules are associated with nitrogen fixation.—[D.P.Y.]

646/2. QUERCUS PETRAEA (Matt.) Liebl. Weimarck, H., 1947, Bidrag till Skånes Flora, 37: Distribution and ecology of Quercus petraea, *Bot. Not.*, **1947**, 189-206. The sessile oak seldom forms pine woods in Scania, and as a rule is associated with other trees, especially *Q. Robur*. The distribution in the provinces is unequal and is restricted to acid soils in broken country, mountain precipices, hill tops and upper slopes. Analyses of a number of soil profiles in sessile-oak woods are given and cultural experiments to determine behaviour in different soils are described.—[A.E.W.]

650. Salix. Harrison, J. Heslop, 1949, Intersexuality in Irish Willows, *Irish Nat. Journ.*, **11**, 269-272. Both " androgyna " and " metamorphosans " forms are found in Ireland. The former have perfect male and female florets in the same catkin, and the latter florets in various degrees of transition between male and female. The former were found in *S. Caprea* and *S. atrocinerea*, and the latter in *S. Caprea*, *S. aurita* and *S. atrocinerea*.—[A.H.G.A.]

669. Orchis. Harrison, J. Heslop, 1949, Orchis cruenta Müll.: a new Irish Marsh Orchid, *Irish Nat. Journ.*, **11**, 329-330. An orchid identified as *O. cruenta* was found around the shores of lakes overlying the limestone plain of E. Mayo and N.E. Galway. The species belongs to the *majalis* group, but is easily distinguished by anthocyanin pigmentation of the stem and leaves. Outside Ireland it occurs in Scandinavia, Russia, Siberia and the Alps.—[A.H.G.A.]

669. Orchis. d'Alleizette, C., 1948, Les Orchidées de Souppes (Seine et Marne), *Bull. Soc. Franç. Ech. Pl. Vasc.*, **1947**, fasc. 1, pt. 1, 14-18. The locality is remarkable for the large number of hybrids, which include ×*O. carnea* G. Cam. (*elodes* × *incarnata*), ×*O. Aschersoniana* Hausskn. (*incarnata* × *latifolia*), ×*O. ambigua* Verm. (*incarnata* × *maculata*), ×*O. Uechtritziana* Hausskn. (*incarnata* × *palustris*), ×*O. Braunii* Halacsy (*latifolia* × *maculata*), ×*Orchiplatanthera Chevallieriana* G. Camus (*O. elodes* × *Platanthera bifolia*) and ×*Orchigymnadenia souppensis* G. Camus (*O. elodes* × *Gymnadenia conopsea*).—[A.H.G.A.]

669. Orchis. Vermeulen, P., 1949, Varieties and forms of Dutch Orchids, *Ned. Kruidk. Arch.*, **56**, 204-242. *Dactylorchis* is maintained as a genus, several new varieties are described and a few British specimens are cited.—[A.H.G.A.]

706. Scilla non-scripta (L.) Hoffmansegg & Link. Peace, T. R., and Gilmour, J. S. L., 1949, The effect of picking on the flowering of Bluebell, Scilla non-scripta, *New Phyt.*, **48**, 115-117. It is concluded from experiments at Oxford and at Kew that no harm can be done by moderate picking or pulling, preferably spread over a wide area; trampling on leaves causes marked deterioration.—[K.S.H.]

719. Luzula. Nordenskiöld, H., 1949, Somatic chromosomes of Luzula, *Bot. Not.*, **1949**, 81-92. The chromosome numbers of thirteen species are given of which the following occur in Britain. *L. campestris* (L.) DC., 2n = 12; *L. multiflora* (Retz.) Lej., 2n = 36; *L. pallescens* Sw., 2n = 12; *L. spicata* (L.) DC., 2n = 24; *L. arcuata* (Wahlenb.) Sw., 2n = 36; *L. pilosa* (L.) Willd., 2n = *c.* 70; *L. sylvatica* (Huds.) Gaud., 2n = 12; *L. luzuloides* (Lam.) Dandy & Wilm., 2n = 12. The material examined was collected in Sweden. Some of these numbers differ from those previously determined by other workers. It is suggested that the divergence may be due either to the existence of different chromosome races or to the use of wrongly named material. " The

chromosome numbers form a polyploid series with three as the basic number. In spite of this fact, some species have a chromosome size remarkably different from that of other closely-related species. The different chromosome lengths occurring among the species studied are found around the following magnitudes (expressed in μ): 1.9, 1.1, 0.7, 0.4, and the smallest about 0.3. The most common chromosome size is 1.1μ. This size throughout in the cells is found in *L. campestris*, *L. multiflora*, *L. frigida*, *L. arctica*, and *L. parviflora*. *L. sudetica* and *L. pilosa* have the smallest chromosomes, the former having 0.4μ and the latter about 0.3μ. *L. spicata* has a chromosome size of 0.7μ, *L. silvatica*, *L. luzuloides*, and *L. nivea*, on the other hand, have a chromosome size of about 1.9μ. *L. arcuata* seems to have three different chromosomes sizes in the cells of about 1.9μ; 1.1μ; 0.7μ. Probably there are 12 chromosomes of each size in the cell."—[A.E.W.]

723. ARUM MACULATUM L. Sowter, F. A., 1949, Arum maculatum L., *J. Ecol.*, **37**, 207-218 (Biological Flora).

740. ZOSTERA. Parish, E. L., 1949, Vanishing Eelgrass a problem affecting wild-fowler and fishermen, *Country Sportsman*, **26**, 221-222. The disappearance of large areas of eelgrass is a catastrophe, because it teemed with marine life and was valuable to fish and fowl. Prawns, widgeon and Brent geese are affected. A two-mile stretch from Selsey Bill to Pagham Harbour had disappeared by 1919. The chief cause of decrease seems to be the wasting disease caused by the fungus *Labyrinthula*. Oil pollution is also considered in this connection.—[A.H.G.A.]

740. ZOSTERA. Parish, E. L., The Eel-Grasses of Britain, *Shooting Times*, 28 Jan. 1950. The author illustrates the species of *Zostera* and describes their differences. He states that fishermen have seen plants 6 to 8 feet long and up to 12 mm. wide, and asks that any plants of this size found growing round the British coast should be sent to the Natural History Museum.—[A.H.G.A.]

745. ELEOCHARIS R. Br. Walters, S. M., 1949, Eleocharis R. Br. (Biological Flora), *J. Ecol.*, **37**, 192-206. The general account of the genus, defined as by Svenson to include *Eleocharis pauciflora* (Lightf.) Link and *E. parvula* (R. & S.) B., N. & S., includes information on the general morphology and cytology of the six species, and indicates differences in their habitat preferences. In the account of *E. palustris* (L.) R. Br. emend. R. & S., two new subspecies are published, viz., ssp. *vulgaris* and ssp. *microcarpa*. The former is the common plant throughout the British Isles, whilst ssp. *microcarpa* seems to be restricted to S. and S.E. England and the Midlands, being recorded for v.-c.s 7, 13, 15, 16, 17, 19, 21, 22, 23, 25, 28, 29, 33, 37. In Europe both subspecies occur, but ssp. *microcarpa* becomes commoner to the south and east. The differential characters of the two subspecies are quantitative, as follows:—

ssp. *vulgaris*	ssp. *microcarpa*
spikes usually 20-40 flowered.	spikes usually more crowded, 40-70 flowered.
glumes (from middle of spike) 3.5-4.5 mm. in length.	glumes 2.75-3.5 mm.
fruit, excluding style-base, usually 1.4-1.8 mm. long.	fruit usually 1.2-1.4 mm.
stomatal length 0.065-0.850 mm.	stomatal length 0.05-0.065 mm.
chromosomes 2n=38.	chromosomes 2n=16.

The account of *E. uniglumis* includes a differential description of this species, in which the following characters are mentioned as distinguishing it from *E. palustris*:—Haulms *slender*, even under favourable growth conditions; rhizomatous development *strong*. Basal leaf-sheaths *deeper reddish purple*. Spike *few (15-30) flowered; single sterile basal glume* surrounding base of spike. Style-base of fruit *often broader than long; bristles 4(5)*: fruit surface usually more *strongly and coarsely punctate* under lens.—[S.M.W.]

746/7. Scirpus caespitosus L. Duwen, J. M., 1948, De Veenbies. Trichophorum caespitosum Hartm., *De Levende Natur*, **52**, 168-171.

746. Scirpus. Beetle, A. A., 1949, Annotated List of Original Descriptions in Scirpus, *Amer. Midl. Nat.*, **41**, (2), 453-493. 1,550 specific and 322 subspecific names are listed with references and referred to their place in synonymy when the species are not accepted. *S. compressus* (L.) Pers. is referred to *Nomochloa compressa* (L.) Beetle. —[A.H.G.A.]

750/1. Cladium Mariscus (L.) R. Br. Hansen, S., 1949, Bidrag til Skånes Flora, 43, Cladium mariscus in Skåne, *Bot. Not.*, **1949**, 127-136. The distribution and ecology of the species in Scania, Sweden, is discussed.—[A.E.W.]

753/15. Carex binervis Sm. Nelmes, E., The Utricle of Carex binervis Sm. and its two submarginal ribs, *Kew Bull.*, **1949**, 318. The prominent green submarginal ribs are not characteristic as stated by Smith, but are found in many other species, for example *C. laevigata* Sm.—[A.H.G.A.]

777. Phleum. Litardière, R. de, 1948, Sur l'existence dans les Pyrenées d'une nouvelle race chromosomique du groupe du Phleum alpinum L., *Comptes Rendus Acad. Sci.*, **226**, 1327-1329. Two species have been distinguished. *P. alpinum* L., self-fertile, 2n = 14, arista ciliate, and *P. commutatum* Gaud., self-sterile, 2n = 28, arista scabrid. The new plant has the chromosome number of *P. alpinum* with the morphological characters of *P. commutatum*.—[A.H.G.A.]

791. Deschampsia. Nygren, A., 1949, Studies in vivipary in the genus Deschampsia, *Hereditas*, **35**, 27-32.

791/3. Deschampsia setacea (Huds.) Hackel. Buschmann, A., 1948, Charakteristik und systematische Stellung von Deschampsia setacea (Huds.) Hackel, *Phyton*, **1**, (1), 24-41. *D. setacea* is an Atlantic species found from the north coast of Europe from Spain to Holstein, Rügen, Bornholm, southern Scandinavia and the British Isles.

The author places it in the section *Campbella*. The structure of the epidermal cells of the root is considered useful for the separation of the species. A key is given. There are also keys, accompanied by illustrations, which are based on the leaf-structure and on the palea (Deckspelze) and the glumes. Differences in the anthers and caryopsis are also discussed. A chromosome number of 2n = 28 is given for *D. flexuosa*, and 2n = 14 for *D. setacea*.—[A.H.G.A.]

813/1. MOLINIA CAERULEA (L.) Moench. Matuszkiewicz, A. & W., 1948, A Contribution to the taxonomy of the Genus Molinia Schrk., *Ann. Univ. Mariae-Curie*, Lublin, **3**, 347-367. (Polish with English summary). The scheme of classification is:—

a. Large plant (77)-111.8-132.1-(215) cm., with broad leaves (5)-7.6-8.7-(14) mm.
  b. Large panicle, (35)-43.0-(54) cm. long; long leaves (45)-57.2-(69) cm. Spikelets (4.9)-5.07-(7.0) mm. long; lower outer glume (2.4)-2.59-(2.8) mm. long; upper glume (2.7)-3.07-(3.4) mm. long; lower flowering glume (3.2)-4.02-(5.2) mm. long ..... 1. subsp. *arundinacea* Schrank.
  bb. Smaller panicle (19.5)-25.2-(38) cm. long; leaves shorter (21)-34.6-(45) cm. long. Spikelets large (5.4)-6.71-(8.0) mm. long; lower outer glume (2.3)-3.02-(4.4) mm. long; upper outer glume (2.8)-3.55-(4.6) mm. long; lower flowering glume (3.7)-4.6-(5.5) mm. long ..... 2. subsp. *litoralis* (Host).
aa. Smaller plants 52-124 cm. high, with narrow leaves (3.5)-5.05-5.53-(7.9) mm. broad; spikelets (3.2)-4.76-5.06-(6.3) mm. long; lower flowering glume (2.7)-3.50-3.73-(4.71) mm. long ..... 3. subsp. *minor* Besser.
aaa. Very small plants. Leaves (2.1)-3.4-(4.0) mm. broad, (2)-10.8-(16.5) cm. long; small spikelets (3.5)-4.31-(5.8) mm. long; lower outer glume (1.5)-2.02-(2.8) mm. long, upper outer glume (1.9)-2.42-(3.0) mm. long; lower flowering glume (3.0)-3.44-(3.8) mm. long ..... 4. subsp. *minima* Mat.

[A.H.G.A.]

824/14. POA ANNUA L. Litardière, R. de, Recherches sur les Poa annua subsp. exilis et subsp. typica, *Rev. Cytol. et Cytophysiol. végét.*, **3**, 135.

824/14. POA ANNUA L. Magron, T., 1947, *Bull. Soc. Bot. Fr.*, **94**, 317-319. The adaptation of *Poa annua* L. to high altitudes in the Central Pyrenees is discussed. It is suggested that the perennial mountain form (*P. annua* subsp. *varia* (Gaud.)) is derived from the lowland plant (*P. annua* subsp. *typica* (Beck.)) by adaptation to mycorrhiza. The lowland plant is without mycorrhiza or the mycorrhiza is destroyed soon after it invades the roots. Quoting M. de Litardière *P. annua* subsp. *typica* is stated to be tetraploid (2n = 28) whilst *P. annua* subsp. *varia* includes two "varieties": *P. supina* (Schrad.) Reichb. a diploid (2n = 14) and *P. rivulorum* (Maire et Trab.) R. Lit. et Maire, emend. a tetraploid (2n = 28).—[A.E.W.]

825/3b. GLYCERIA DECLINATA Bréb. Walters, S. M., 1948, Glyceria declinata Bréb., En förbisedd nordisk art, *Bot. Not.*, **1948**, 430-440. The occurrence of the species in Denmark, Norway and Sweden is discussed. He states that " the plant seems to have a S.W. distribution in Scandinavia. Ecologically it may be confined in Sweden to eutrophic regions; although this is not the case in Britain. Many Scandinavian localities resemble the typical localities for the plant in Britain, i.e. disturbed or trodden ground by water. Its general European distribution is by no means clear, but it appears to be western (material from

France, Portugal and N.W. Germany has been seen), and no certain records are known from Central or eastern Europe".—[A.E.W.]

825(2)/2×1. PUCCINELLIA DISTANS (L.) Parl. × P. MARITIMA (L.) Parl. Jansen, P., 1949, Floristische Aantekeningen, No. 5, × Puccinellia Krusemaniana Jans. & Wacht., *Ned. Kruidk. Arch.*, **56**, 248. *Glyceria maritima* × *G. procumbens*, which was originally described from Chichester, Sussex, by Druce, is referred to this hybrid, which was formerly described and figured in the same journal in 1932. There the description reads (translated):—"Larger than *P. maritima*, which it resembles in habit and superficial sterile stolons, but differs from it by the flat, narrow and flaccid (not rigid and folded) leaves of the stolons. Panicle like *P. maritima* but rigid, basal branches with sessile spikelets. Verticils composed of two long and one short branches, the longer alternating, the shorter secund (as in *P. rupestris*). Spikelets large (8-9 mm. long), glumes 1-3-nerved, lemma (when dry) prominently nerved; anthers large (2 mm. long) with a few abortive pollen grains. Fruit sterile."—[A.H.G.A.]

826. FESTUCA. Litardière, R. de, 1947, Festuca nouveaux ou rare des France et d'Espagne, *Bull. Soc. Hist. Nat. Toulouse*, **82**, 110-122. Deals mainly with varieties of *F. ovina*.—[A.H.G.A.]

827/4. BROMUS TECTORUM L. Stewart, G., & Hull, A. C., 1949, Cheatgrass (Bromus tectorum L.), An ecologic intruder in southern Idaho, *Ecology*, **30**, 58-74. An adventive from Europe, first recorded in the U.S.A. about 50 years ago, and from southern Idaho about 1900, has, in that State, become a dominant species over large areas. At first it occurred on roadsides, and in cultivated land, etc., and then spread to range lands wherever the plant cover was badly injured by drought, fire or overgrazing. The biological and ecological relationships of this grass and its control are discussed. It is said to be valuable for soil protection, but is highly inflammable and allows fires to spread rapidly.—[A.E.W.]

828. BRACHYPODIUM. Jouvet, P., & Bouby, H., 1949, Brachypodium phoenicioides Roem. & Schult., *La Feuille des Naturalistes*, N.S., **4**, 68. This species is recorded from near Paris, perhaps introduced on a railway bank. It was previously known from Southern France and the west Mediterranean. It looks like *B. pinnatum*, but is glaucous with inrolled leaves shortly mucronate.—[A.H.G.A.]

835. HORDEUM. Covas, G., 1949, Taxonomic Observations on the North American species of Hordeum, *Madroño*, **10**, 1-21. The North American representatives of *H. nodosum* are separated as *H. californicum* and *H. brachyantherum*. *H. Stebbinsii* and *H. leporinum* are separated from *H. murinum*. *H. marinum* Huds. is only a casual in U.S.A.—[A.H.G.A.]

847/1. PTERIDIUM AQUILINUM (L.) Kuhn. Conway, E., & Arbuthnot, M., 1949, Occurrence of endotrophic mycorrhiza in roots of Pteridium aquilinum Kuhn, *Nature*, **163**, 610. Bracken roots from two areas in W. Scotland (v.-c. 75 and 99), one acid moorland and the other cul-

tivated ground, contained hyphæ of an endotrophic fungus. Affected roots were often rather fleshy and larger than normal.—[D.P.Y.]

FLORAS, Etc.

Belgium. Lawalrée, A., 1949, Catalogue des Ptéridophytes de Belgique, *Lejeunia*, **13**, 21-27. A revised catalogue arranged by Copeland's system. *Isoetes echinospora* Durieu is reduced to *I. tenella* Lem. Belgium has *Lycopodium tristachyum* Pursh, *Selaginella helvetica* (L.) Spreng, *Botrychium simplex* Hitchc., *Azolla caroliniana* Willd. and *Asplenium foresiacum* (Le Grand) Christ, which do not occur in Britain.—[A.H.G.A.]

Holland. Heukels, H., 1949, *Geillustreerde Schoolflora voor Nederland*, ed. 13 (by W. H. Wachter & S. J. van Ooststroom), Groningen, 900 pp. In Dutch. It has keys and illustrations. Many aliens are also described.—[A.H.G.A.]

Palestine. Duvdevani, S., & Osherov, S. Analytical key for the identification of wild plants in yard, garden and field, from their leaves, stems and roots, (in Hebrew), *Kew Bull.*, **1948**, 45-46. W. B. Turrill reviews the work and points out that such a key could be of value to specialists, e.g. ecologists and horticulturists, who have to follow their plants through their whole life histories. There are special difficulties in the preparation of a key based on vegetative characters, for example, change in leaf shape with age of the individual plant, but it is felt that many will agree with the author's conviction that very much more use should be made of vegetative characters in floras and monographs.—[K.S.H.]

HISTORY.

Dony, J. G., 1949, A Bobart Herbarium at Bedford, *Beds. Nat.*, **3**, 15-16. Quotes *Proc. Linn. Soc.*, **160**, Pt. 1 (Nov. 1946).—[J.G.D.]

Dony, J. G., 1949, Bedfordshire Naturalists: III, Charles Abbot, *Beds. Nat.*, **3**, 38-42. An account with original information of the work of Abbot (1761-1817), author of *Flora Bedfordiensis* (1798), etc.—[J.G.D.]

Edees, E. S., 1948, The Early History of Field Botany in Staffordshire, 1597-1839, *Trans. N. Staffs. F.C.*, **82**, 81-110.

Edees, E. S., 1949, Richard Forster of Stone, *Trans. N. Staffs. F.C.*, **83**, 96-97. Gives some biographical details relating to the late 18th century Staffordshire botanist, Richard Forster.—[A.E.W.]

Grant, V., 1949, Arthur Dobbs (1750) and the Discovery of the Pollination of Flowers by Insects, *Bull. Torr. Bot. Club*, **76**, 217-219. The discovery of the pollination of flowers by insects has usually been attributed to J. G. Kölreuter, but the author points out that the Irish amateur botanist Dobbs preceded him.—[A.H.G.A.]

Rumilly, R., *Le Frère Marie-Victorin et son temps.* Brother Marie-Victorin, whose real name was Conrad Kirouac, was a teacher at the College of Longueuil at Westmount, Canada. His deeply reli-

gious and mystic personality, combined with an enthusiasm for the teaching of Science, made him many friends and admirers. Specialising in Botany, he was given the Chair in Botany at the University of Montreal. This book describes in detail this period of Canadian history, a period which may be said to have produced in him one of the most famous men of French Canada. The book consists of 500 pages and the price is $2. The most important of a number of Marie-Victorin's publications appears to be *La Flore Laurentienne*, published in 1935, price $10. Both the above books are to be obtained from Les Frères des Écoles Chrétiennes, 949, rue Côté, Montreal, 1, Canada.—[W.R.P.]

Sarton, G., 1948, *Introduction to the History of Science*, **3**, pt. 2, Carnegie Inst. The second half of the third volume, which brings the work done to the end of the fourteenth century. The author states that the Silesian doctor Thomas of Sarepba (1297-c. 1378) made himself a herbarium of dried plants, which is the earliest mention of such a collection except that Villard de Honnecourt gave a recipe for the preservation of colours in dried flowers. The herbarium contains some English specimens mentioned in the MS. Michi competit.—[A.H.G.A.]

NOMENCLATURE

Furtado, C. X., 1949, A Further Commentary on the Rules of Nomenclature, *Gardens Bull. Singapore*, **12**, 311-377.

Herter, W. A., 1949, Weitere Vorschläge zur Abänderung der Nomenklaturregeln (Further proposals for the alteration of the rules of Nomenclature), *Rev. Sudamer. Bot.*, **8**, 11-12. An amplification of proposals published in *Rev. Sudamer. Bot.*, **6**, 46 (1938) for the modification of certain articles and recommendations of the International Rules of Nomenclature.—[K.S.H.]

Horn af Rantzien, H., & Olsen, S., 1949, A suggested starting-point for the nomenclature of Charophyta, *Svensk. Bot. Tidskr.*, **43**, 98-103. The authors suggest Alexander Braun's *Fragmente* (1883) instead of Linnaeus, largely to avoid the old names revived by Groves and Bullock-Webster.—[A.H.G.A.]

International Rules of Botanical Nomenclature, 1947, *Brittonia*, **6**, 1-120. Formulated by the International Botanical Congress of Vienna, 1905, Brussels, 1910, and Cambridge, 1930, adopted and revised Amsterdam, 1935. Compiled from various sources by Camp, W. H., Rickett, H. W., and Weatherby, C. A.—[K.S.H.]

Lawrence, G. H. M. Discussions in Botanical Names of cultivated plants, *Gentes Herbarum*, **8**, 3- . The author adopts *Anemone hybrida* Paxt. for the garden plant misidentified with *A. japonica* Thunb., *Arabis caucasica* Willd. for the *A. albida* of gardens, *Lens culinare* Medic. for *L. esculenta* Moench, *Oenothera erythrosepala* Borb. for *O. Lamarckiana* De Vries (non Seringe), *Stachys olympica* Poir. for *S. lanata* Jacq. non Crantz, ×*Nepeta Faassenii* Bergmans for *N. Mussinii* hort., *Collinsia heterophylla* R. Grah. for *C. bicolor* Benth., *Echinops*

exaltatus Schrad. for *E. Ritro* hort. amer. and *E. sphaerocephalus* hort. amer. and *Dimorphotheca pluvialis* (L.) Moench for *D. annua* Less. (*Gattenhoffia pluvialis* (Moench) Druce). *Rudbeckia columnifera* Nuttall is said to be the commonly cultivated Coneflower. The generic separation of *Pyrus* and *Malus* is discussed. The pale form of *Impatiens glandulifera* Royle is designated forma *pallidiflora* (Hook.) Weatherby. —[A.H.G.A.]

Lawalrée, A., 1949, Note sur quelques ptéridophytes de Belgique, *Bull. Jard. Bot. Brux.*, **19**, 237-242. The author makes a number of new combinations for varieties and forms.—[A.H.G.A.]

McVaugh, R., 1949, Questionable validity of names published in Gilibert's Flora of Lithuania, *Gentes Herbarum*, **8**, 83-90. The writer gives arguments for rejecting Gilibert's names.—[A.H.G.A.]

Pichon, M., 1948, Sur l'article 37 ter des Règles de la Nomenclature, *Notulae Systematicae*, **13** (4), 253-260. The writer discusses the article, which reads:—"A name of a taxonomic group is not validly published unless it is definitely accepted by the author who publishes it. A name proposed provisionally (nomen provisorium) in anticipation of the eventual acceptance of the group, or if a particular circumscription, position or rank of a given group, or merely mentioned incidentally, is not validly published." He argues that the simultaneous publication of alternative names, such as *Cymbopogon Bequaerti* and *Andropogon Bequaerti* should be valid.—[A.H.G.A.]

Schwarz, O., 1949, Beiträge zur Nomenklatur und Systematik der mitteleuropäischen Flora, *Mitt. Thüring. Bot. Ges.*, **1** (1), 82- . The author adopts:—*Allosorus* Bernh. for *Cryptogramma* R. Br., *Gymnocarpium obtusifolium* (Schrank) O. Schwarz for *G. Robertianum* (Hoffm.) Newm., *Polystichum paleaceum* (Borck.) O. Schwarz for *P. Braunii* Spenn., *Sparganium minimum* Wallr. (1840) for Fries (1846), *Bromus ramosus* Huds. for *B. asper* auct., *Agropyrum littoreum* (Schum.) O. Schwarz for *A. littorale* (Host) Dum., and many other name changes.—[A.H.G.A.]

Smith, Albert C., 1949, A Legislated Nomenclature for Species of Plants?, *Amer. J. Bot.*, **36**, 624-626. The principle of *nomina specifica conservanda* will doubtless be discussed at the forthcoming Seventh International Botanical Congress to be held at Stockholm in 1950. [It was discussed and again rejected.—Ed.] The author argues that this principle, which has been rejected by previous Congresses, is impracticable; the number of conserved generic names is at least 850, and if the principle were extended to specific names, a very much larger number would be likely to be affected. He considers it is better to have a specific nomenclature which is slowly evolving towards stability under the ministrations of competent specialists.—[K.S.H.]

Symposium on Botanical Nomenclature, 1949, *Amer. J. Bot.*, **36**, 1-32, includes the following papers:—I, Introduction, by Sherff, E. E. II, Botanical Nomenclature since 1867, by Weatherby, C. A. III, Byways of Nomenclature, by Blake, S. F. IV, An Editor's point of

view. V, Adventures in locating validly published but unlisted binomials, by Merrill, E. D. VI, Towards a simple and clear nomenclature, by Pennell, W. VII, Problems in Taxonomy, by Bailey, L. H. VIII, The Problem of Subspecific Categories, by Rosendall, C. O IX, The nomenclature of Fossil Plants, by Just, T.—[K.S.H.]

TOPOGRAPHICAL

5-6, Somerset. The *Proceedings of the Somersetshire Archaeological and Natural History Society*, **92**, 98-100, 1947, contains the recorder's (W. Watson) notes on the more interesting plants observed during 1946.—[A.E.W.]

6, 34, N. Somerset; W. Glos. Sandwith, C. I. & N. Y., 1948, Bristol Botany in 1947, *Proc. Bristol N.S.*, **27**, 203-208.

7-8, Wilts. Collett, Gilbert W., 1949, Some phenological notes, *Wilts. Arch. and N.H. Mag.*, **53**, 94-96.—[A.E.W.]

7-8, Wilts. Grose, J. D., 1948-1949, Wiltshire Plant Notes, *Wilts. Arch. and N.H. Mag.*, **52**, 224-231; **53**, 88-93. Gives a large number of locality records. Several species new to the county are given. See Plant Records.—[A.E.W.]

14, East Sussex. Brightmore, D., 1949, *Hastings and East Sussex Naturalist*, **7**, 172-174, lists the more interesting records made during 1948 and also gives a list of species observed during 1946 on eight bombed sites in closely built-up areas in Hastings. 59 species are recorded, the highest number from any one site being 33, and the lowest 13.—[A.E.W.]

28, W. Norfolk. Chapman, V. J., 1948, Some Vegetational Changes on a shingle off-shore bar at Thornham, West Norfolk, *Trans. Norfolk and Norwich N.S.*, **16**, 274-279. The article is illustrated by photographs and three vegetation maps of Thornham Island in 1937 and 1941 with lists of species.—[A.E.W.]

32, Northants. Collyer, E., Allen, H. G., and Gilbert, J. L, 1949, *Journ. Northants N.H.S.*, **31**, 188-194. Notes on the more interesting plants met with in 1948, and J. Wilson gives a list of 18 species found by the River Nen between Westley's Mill and the paper mills in the same year.—[A.E.W.]

32, Northants. Gilbert, J. J., 1948, Botanical Records, 1947, *Journ. Northants N.H.S.*, **31**, 131-134. *Lactuca Serriola* L. recorded from waste places in Peterborough is apparently new to the county.—[A.E.W.]

39, Staffs. Edees, E. S., 1948, *Trans. N. Staffs. F.C.*, **82**, 138-148. Reports on botanical activities and gives the Plant Notes and Records for 1947, and an account of *Myrica Gale* L. in the county, and Records for 1949, *ibid.*, **83**, 88-96. *Cochlearia danica* L. is recorded as an inland adventive.—[A.E.W.]

40, Shropshire. Lloyd, Ellen R., 1949, *Trans. Caradoc and Severn Valley F.C.*, **12**, 25-27. A report on the botany for 1943-44. The list of plants is preceded by a few phenological notes.—[A.E.W.]

63, S.W. York. Jackson, G., & Sheldon, J., 1949, The Vegetation of Magnesian Limestone Cliffs at Markland Grips near Sheffield, *J. Ecol.*, **37**, 38-50. Includes a discussion of the status of *Tilia platyphyllos*, and it is concluded that there are strong reasons against regarding it as a native tree of the area. *Carex montana* and *C. ericetorum* are recorded.—[K.S.H.]

96, Easterness; 97, Westerness. Gordon, S., 1950, Snow Flora of the Scottish Hills, *Nature*, **165**, 132-134. In Scotland two small snowfields usually, and perhaps permanently, remain unmelted throughout the year: under Ben Nevis and in Garbh Choire Mor, Braeriach. The flora around the margins, which are free from snow for progressively shorter periods as one approaches the permanent snow, is described. Phanerogams which grow in the area uncovered by snow for only a few weeks in the year (in October) on Braeriach are *Saxifraga stellaris* and *Gnaphalium supinum*; only the latter ripens seeds. The only phanerogam around the snowfield on Ben Nevis is *S. stellaris*, which never flowers, and which may arise from seeds from the colony on the plateau above.—[D.P.Y.]

104, N. Ebudes. Raven, J. E., 1949, Alien plant introductions on the isle of Rhum, *Nature*, **163**, 104-105. *Polycarpon tetraphyllum* L. was first detected at Kinloch Burn by J. W. Heslop Harrison in 1939, when there was a single plant. On the 6th Aug. 1948 the author found four plants, which differed in their much-branched inflorescence and narrow acuminate sepals from the southern English form, and indeed did not match any specimen in the British Museum Herbarium, although they were most like Maltese and Greek material. Amongst one of the plants was growing a small plant of *Wahlenbergia* (?) *nutabunda* A. DC., which is subspontaneous in some botanical gardens but otherwise unknown in Britain. The author also saw *Carex bicolor* Bell. in a recently found colony (the third to be discovered) in Coire Dubh. This consisted of seven mature and two young plants, on bare gravel banks at the junction of two small burns. Six of these had *Poa annua* L. and/or *Sagina apetala* Ard. sprouting amongst the leaves, although neither of these could be found elsewhere in the neighbourhood, which was an unlikely habitat for either. Associated with both *Polycarpon* and the *Carex* was the very rare *Juncus capitatus* Weig. The author concludes that *Polycarpon tetraphyllum* and *Carex bicolor* are both introductions in these stations.—[D.P.Y.]

110, Outer Hebrides. Poore, M. E. D., & Robertson, V., 1949, The Vegetation of St Kilda in 1948, *J. Ecol.*, **37**, 82-99. Considerable changes have occurred in plant species since the evacuation in 1930 of the human population and their grazing animals.—[K.S.H.]

MISCELLANEOUS

Abbayes, H. des. Quelques Phanérogames adventices de Bretagne, III, *Bull. Soc. Sci. Bretagne*, **21**, 61-62; *op. cit.* **22**, 73-76 (1947).

Allan, H. H., 1949, Wild Species-Hybrids in the Phanerogams, II, *Botanical Review*, **15** (2), 77-105. This is a supplement to the author's paper in vol. **3**, 593-615 (1937) of the same periodical. There is a useful list of hybrids recorded with references to the original papers.—[A.H.G.A.]

Behrens, G., 1949, Blüten- und Gestaltsbildung bei Chrysanthemum und Sempervivum unter photoperiodischen Einflüssen, *Biol. Zentralbl.*, **68**, 1-32. Phyllody of the inflorescence can be brought about by photoperiodic influences.—[A.H.G.A.]

Bellringer, H. E., 1949, Phyto-photo-dermatitis, *Brit. Med. J.*, **1949**, **1**, 984-986. Attention is drawn to the fact that blistering of the skin may occur after 24 hr. following contact *in bright sunlight* with *Anthriscus sylvestris*, *Pastinaca sativa*, *Achillea Millefolium*, *Angelica sylvestris*, *Ranunculus bulbosus*, *Sinapis arvensis*, *Convolvulus arvensis*, *Heracleum Sphondylium*, *giganteum* and *Mantegazzianum*, "meadow grass", *Agrimonia Eupatoria* and *Rutaceae*.—[D.P.Y.]

Chenery, E. M., 1948, Aluminium in the plant world, *Kew Bull.*, **1948**, 173-182. The author considers that the uptake of aluminium has some value in plant taxonomy, as it appears to be highly specific.—[K.S.H.]

Gustafsson, A., 1948, Polyploidy, Life-form and Vegetative Reproduction, *Hereditas*, **34**, 1-22. Mentions evolutionary trends in *Poa*, *Bromus*, *Juncus*, *Rumex*, *Polygonum*, *Chenopodium*, *Stellaria*, *Cerastium*, *Sagina*, *Ranunculus*, *Papaver*, *Lepidium*, *Cardamine*, *Sedum*, *Saxifraga*, *Alchemilla*, *Medicago*, *Trifolium*, *Vicia*, *Lathyrus*, *Geranium*, *Malva*, *Viola*, *Myosotis*, *Lamium*, *Stachys*, *Solanum*, *Veronica*, *Plantago*, *Galium*, *Campanula*, *Erigeron*, *Gnaphalium*, *Chrysanthemum*, *Senecio*, *Cirsium*, *Centaurea*, *Crepis* and *Sonchus*. Annual groups show low basic numbers, while perennial groups often acquire high basic numbers and high polyploids. Vegetative propagation is thought to be an important agent in these evolutionary events.—[A.H.G.A.]

Dovaston, H. F., 1949, A factor limiting downward spread of some Scottish mountain plants, *Nature*, **164**, 370. It is suggested that, as in the Himalayas, etc., certain Scottish alpines are confined to above the winter snow-line because of their sensitivity to winter moisture. For example, *Veronica fruticans*, *Cerastium alpinum* and *arcticum*, *Arenaria rubella* and *sedoides*, *Lychnis alpina*, and *Gnaphalium supinum* are liable to die off in cultivation at lower altitudes unless protected from rain; the last-mentioned sp. is found as low as 1000 ft., but is then an annual. Other spp., *e.g.* various *Draba*, *Saxifraga*, *Salix*, etc., can tolerate moisture in winter.—[D.P.Y.]

Erdtman, G., 1948, Palynology, aspects and prospects, *Svensk. Bot. Tidskr.*, **42**, 467-483. The paper consists of contributions from various authors reviewing the present position of research on pollen and spores in their respective countries.—[A.H.G.A.]

Fassett, N. C., Herbarium Technique, *Rhodora*, **51**, 59-60. The writer recommends such detergents as "Tide", "Vel" and "Dreft" for softening herbarium material for dissection, instead of boiling.

GODWIN, H., 1949, The Spreading of the British Flora considered in relation to conditions of the late-glacial period, *J. Ecol.*, **37**, 140-147. Over 78 species plus 22 genera have been identified from Late-Glacial or Early Post-Glacial mud layers at Nazeing near London, and native status has been in consequence assured to such plants as *Linaria vulgaris, Taraxacum officinale et alia.* It seems probable that as such work proceeds, more and more of our ruderal and weed species will be recognised as being native to the British flora. Several species have been identified widely beyond their present-day area in Britain; their contraction was probably largely due to dense forest establishment, and to a lesser degree to the development of peat meres upon flat and gently sloping mountains at altitudes above the forest limit. Under-representation of certain categories of British plants in Ireland can be explained as a result of their being able to spread in the Late-Glacial or Early Post-Glacial period owing to temperature limitations. Later movement was hindered by the Irish Sea, which previously occupied only a very small area, having reached its present size.—[K.S.H.]

KLOOS. A. W., 1948, Nieuwe vondsten van zeldzame planten in Nederland in 1943-1947. *De Levende Natur*, **51**. 75-79.

LINDQUIST, B., 1948. The main varieties of Picea Abies (L.) Karst. in Europe. *Acta Hort. Berg.*, **14** (7). 249-342. The writer finds that there is a striking agreement between the presumed glacial refuges and the habitats of *Picea Abies* var. *arctica* Lindq., and adds a general discussion of the Scandinavian refuges. Some were nunataks and some probably areas now submerged. The species regarded as probable glacial survivors are *Pedicularis flammea. Rhododendron lapponicum, Vahlodea atropurpurea. Papaver* spp.. *Arenaria humifusa, A. norvegica. Poa flexuosa. P. arctica, Luzula parviflora, Aconitum septentrionale. Anemone ranunculoides. Viola rupestris, Ranunculus platanifolius. Alchemilla glomerulans, A. Wichurae, Urtica dioica* var. *Sondenii, Betula tortuosa, B. callosa, Draba crassifolia, Cavernularia Hultenii* (lichen), *Tholurna dissimilis* (lichen) and others. The bulk of the mountain flora and a number of sub-alpine species are considered to be glacial survivors.—[A.H.G.A.]

LINTON, D. L., 1949, Unglaciated enclaves in glaciated regions, *Irish Geography*, **2** (1), 1.

POST-GLACIAL CLIMATE CHANGE, 1949, *Nature*, **163**, 160-161. Record of joint meeting of Royal Meteorological and Royal Astronomical Societies. Dr Godwin describes pollen analyses indicating a climatic optimum about 3000 B.C., and a sudden worsening about 500 B.C. Holly and ivy are controlled by winter temperature and mistletoe by summer temperature. Prof. Manley stated that the greatest post-glacial expansion of glaciers began in Scandinavia about 1750 A.D., in the Alps 1550 and in Iceland 1350. Glaciers are now retreating rapidly. Dr Brooks stated that tidal maxima would tend to break up the Arctic ice-cap and ice would drift into the Atlantic.—[A.H.G.A.]

POUCQUES, M. L. DE, 1949, Recherches caryologiques sur les Rubiales, *Rev. Gén. Bot.*, **56**, 5-27, 75, 138, 172-188. The chromosome numbers

of a number of genera have been counted, and the writer makes the following comments. Polyploidy is frequent in *Galium* and *Rubia*. *Adoxa* bears a strong resemblance to the *Caprifoliaceae* in caryological characters, and these justify a separate family for the genus. New counts are given for *Sambucus Ebulus* (n = 18), *Lonicera Caprifolium* (n = 9), *L. Xylosteum* (n = 9), *L. Periclymenum* (n = 18), *Kentranthus ruber* (n= 7).—[A.H.G.A.]

Reid, Mrs E. M., 1949, The Late Glacial Flora of the Lea Valley, *New Phyt.*, **48**, 245-252. The paper discusses material from Lea Valley pits, provided in 1933 and subsequently by Hazeldine Warren, and incorporates with this the results of the earlier investigations of the Lea Valley flora made by Clement Reid (1910) and by Reid, E. M., and Chandler, M. E. J. (1923). Material from a total of ten pits is listed; these are tentatively assigned to Sub-arctic climate (3 pits), Cold or Cool (6 pits) and Cool Temperate (1 pit). A list is given of 156 species, some of which are imperfectly identified, with the localities in which they were found. There are included notes on the determination of *Ranunculus hyperboreus*, *R. acris*, *Silene* spp., *Linum praecursor*, *Armeria* sp., *Salix herbacea* and *Carex atrata*.—[K.S.H.]

Tamm, C. O., 1948, Observations on reproduction and survival of perennial herbs, *Bot. Not.*, **1948**, 303-321. Describes investigations to determine the average rate of both reproduction and mortality of some perennial herbs in sample plots. Diagrams are given showing the flowering frequencies in different years and the fates of individual plants of the species examined. A very low rate of renewal in some meadow and forest habitats has been found, and irregular flowering observed in some species. "The longevity of the individual specimens, which is closely connected with the low rate of renewal, is interpreted as an expression of the hard competition within closed plant communities. The significance of this longevity factor for stability and composition of vegetation is briefly discussed". Among the species dealt with are *Filipendula hexapetala*, *Fragaria vesca*, *Orchis mascula*, *Primula veris*, *Sanicula europaea*, and *Taraxacum vulgare*.—[A.E.W.]

Webb, L. J., 1950, Alkaloid tests in herbarium specimens, *Nature*, **165**, 411. A technique is developed for detecting alkaloids in 0.1 g. of dried plant, and herbarium specimens are found to provide suitable material. The alkaloid content fell, in general, with the age of the specimen.—[D.P.Y.]

REVIEWS

Botany of the Canadian Eastern Arctic. Part III: Vegetation and Ecology. National Museum of Canada, Bulletin No. 104. NICHOLAS POLUNIN. Pp. vii + 304, 2 maps, 107 plates in the text. Ottawa: King's Printer, 1948; 75 cents.

The book here noticed is the third part of this very comprehensive account of the plants of North-Eastern Canada. The first part, dealing with the individual flowering plants and Pteridophytes, was reviewed in the *B.E.C. 1939-40 Report*, pp. 391-392.

The present volume describes the plant communities of that part of the region lying north of the 60th parallel of latitude. These are dealt with under the ten major districts adopted in Part I, and this enables comparisons to be made more readily between the two volumes. In each major district a general account of the habitat and plant communities is given, and this is supplemented by (or in some cases chiefly based on) detailed accounts of the vegetation of limited areas visited personally by the author.

The area studied lies between the 60th and 83rd parallels of latitude (about 1600 miles altogether from north to south) and thus experiences a wide range of climatic conditions—though all of an arctic nature—from the severe high-arctic conditions of Ellesmere to the almost subarctic climate of northernmost Quebec. There is also a gradation, though less striking, between the relatively oceanic climates of the eastern seaboard along Davis Strait and the more continental conditions farther west, this being more noticeable in the south.

In spite of these differences it must be remembered that the climate everywhere is very severe in comparison with that of any part of the British Isles, the most southerly districts having only four months (June-September) with a mean temperature above freezing point, while in the extreme north no month is free from frost. This severity may be summed up in the statement that the whole of the region lies north of the tree-line, the tallest vegetation being of willow-scrub, which is said to reach a height of 7-8 feet in favourable places.

Another important factor in the differentiation of the vegetation is the nature of the underlying rock, the two chief divisions being acid granites and gneisses on the one hand, and limestone on the other. Curiously enough, in contrast to Britain, the richest vegetation occurs on the acid rocks, the weathering of the limestone tending to form unsuitable substrata. Much of the ground is covered by glacial deposits, usually derived from one or other (or sometimes a mixture) of the rock types mentioned.

As might be expected, there is a gradual increase in the luxuriance and variety of the vegetation as one passes from north to south, though

the higher areas in the south support much the same vegetation as that of the lowlands farther north. There is also another interesting change in the vegetation as regards the constituent species. In the north nearly all the species are found also in arctic Europe, while many are inhabitants of this country. As one progresses southwards one finds an increasing proportion of American species which there fill the same ecological niches as are filled in Europe by their European counterparts. This is particularly noticeable in the willows, *Carices*, *Eriophora*, etc.

In all districts the most unfavourable localities are occupied by open vegetation (" barrens "), consisting of isolated tufts of various species. These include especially *Saxifraga oppositifolia*, *Cerastium alpinum*, *Papaver radicatum*, *Luzula confusa*, and, except in the extreme north, *Dryas integrifolia*, which throughout the area replaces the European *D. octopetala*, but appears to have almost identical ecological preferences. The dwarf willow *Salix arctica* replaces the European *S. polaris*, but both *S. herbacea* and *S. reticulata* occur.

Where conditions are more favourable " heath " of varying degrees of luxuriance occurs, including such species as *Cassiope tetragona*, *Vaccinium uliginosum*, *V. vitis-idaea*, *Empetrum hermaphroditum*, *Ledum palustre* and other ericaceous plants. This is developed especially on the acid rocks and covers very extensive areas in the southern districts, usually associated with dwarf willows and birches of various species. These heaths are also very rich in Cryptogams, particularly lichens, which are always a striking feature of arctic vegetation.

In especially sheltered valleys, particularly in the southern half of the region, willow-scrub of limited extent is found, while on slopes where the exposure, drainage and nature of snow cover are combined in an exceptionally favourable manner one finds " flower slopes " containing a remarkably rich assemblage of flowering herbs and grasses.

Where the drainage is poor, or in the immediate vicinity of the numerous lakes, extensive marshes are formed, which are dominated by grass-like vegetation. This consists of the widespread grasses *Arctagrostis latifolia*, *Alopecurus alpinus*, and *Dupontia Fisheri*, numerous species of *Carex*, in particular *C. aquatilis* var. *stans*, and species of *Eriophorum*, especially *E. angustifolium* and *E. Scheuchzeri*. In the south, American species of the above groups become increasingly important. Mosses are also very abundant, but *Sphagna* occur in quantity only in the extreme south of the region. Truly aquatic vegetation is found only in the more southern regions, where *Hippuris* and aquatic species of *Ranunculus* are present.

The volume gives a very clear and graphic picture of this region, so unlike our own country in general features and yet with a flora including so many species native to these Islands.

V. S. Summerhayes.

Recherches écologiques sur le littoral de la Manche. Dr JEAN JACQUET. Pp. 374 with 42 line drawing figs. and 27 photogravure plates. Paris: Paul Lechevalier, 1949; Fr. 2500. [25 × 16 cm.; paper.]

Attention should first be drawn to the general title of the book which, if taken literally, somewhat overshadows the most important subject; also to the fact that " Manche " is to be taken in its double meaning: the Channel, in a general sense, and, more particularly as the French department of that name, the littoral of which the author has thoroughly studied.

As a matter of fact, the work primarily centres on *Spartina Townsendii*, and is the practical development of a doctorate thesis on this Anglo-French invader of mud-flats on both sides of the Channel.

A great many notes have been written about the plant and related problems, but most of them have been spread over numerous more or less accessible publications, and no comprehensive work had yet dealt fully with the matter. This long-felt need has now been excellently fulfilled; the author has done much more than bring together the scattered information and has reported many previously unpublished observations.

While *Spartina Townsendii* and its problems in connection with its peculiar habitat, its chemical composition, and hence its possible uses, serve as the central theme of the work, many other matters pertaining to tidal lands and salt-marshes have been studied, e.g., their flora and fauna, their reclamation, the oceanography of estuaries and bays, the little known fluvio-marine deposits such as the " tangue " (i.e., the sort of mud in the Mont-Saint-Michel bay, where *Spartina* thrives), the biology of halophytes, etc. Special emphasis is placed upon some methods of soil and other analysis.

Contents.—Introduction: botanical status of European *Spartina* (13 pp.). 1st Part: comparative anatomy; descriptive anatomy; histology (32 pp.). 2nd Part: geographical distribution; mode of dispersal of *S. Townsendii* (40 pp.). 3rd Part: Chapter I: ecology; bionomical aspect of *S. Townsendii* stations in the department of the Manche; associations; the notion of *slikke* and *schorre* (47 pp.). Chapter II: environmental conditions; climate; waters; soil, chemical composition and physical properties (pp. 91). Chapter III: *S. Townsendii* in its habitat; adaptation; xerophytes *v.* halophytes; influence of salt; resistance to immersion (65 pp.). Conclusions. Bibliography (some 1350 references).

As far as species and hybrids growing in Europe are concerned, the genus is divided into two subgenera, viz.—*Euspartina* (incl. *S. stricta*, *alterniflora*, *Townsendii*, *Neyrauti*) and *Fremya* (incl. only *Spartina juncea* Willd.).

The interest of the book extends far beyond *S. Townsendii*, however fascinating this grass may be, and, therefore, should prove invaluable to all botanists—British and French alike—studying these matters.

The illustrations are a valuable part of the book and the photographs have been adequately selected. P. SENAY.

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